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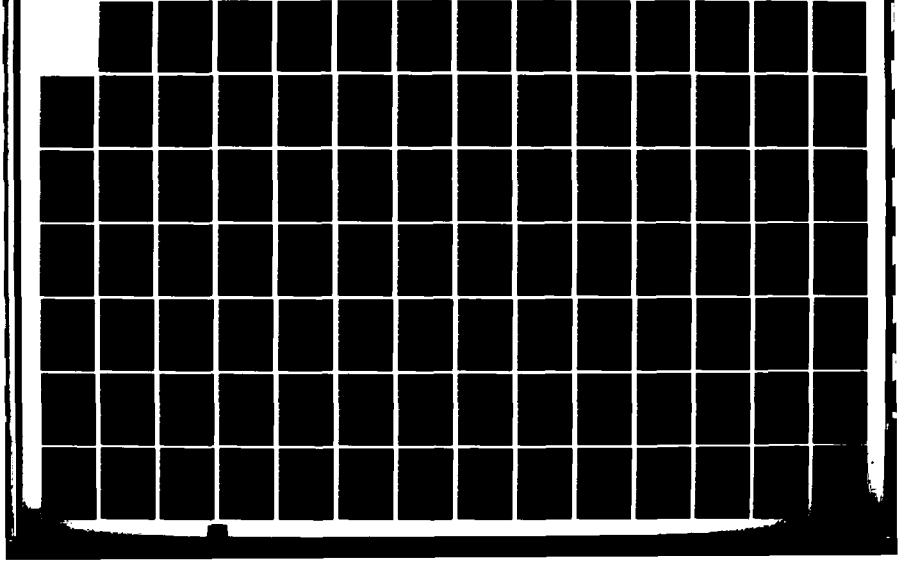

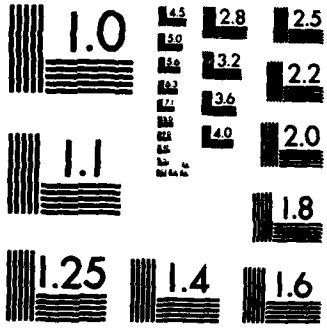

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DEPARTMENT OF THE AIR FORCE

AIR UNIVERSITY

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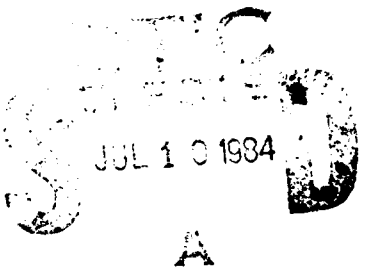
Wright-Patterson Air Force Base, Ohio

SMALL COMPUTER APPLICATIONS FOR BASE SUPPLY

Patrick M. Howard, Captain, USAF

LSSR 116-83



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The small computer has been introduced into many organizations, large and small, computerized and non-computerized, with generally excellent results. Productivity enhancements have been observed, as have improved data processing capabilities. The range of small computer applications are documented in a literature review, which emphasizes their versatility and proving that small computers are a multifaceted tool available to the manager. The Air Force has recently recognized the small computer's capabilities and has taken some positive steps in utilizing the small computer. However, these steps have not yet placed the small computer in large numbers at the base level manager's disposal, nor has there been widely distributed research on small computer utilization at base level organizations. This research effort studies whether small computers and commercial software can assist a base level supply activity accomplish tasks with greater speed and more accuracy, which could provide increased productivity. In addition, the thesis addresses specific problems encountered, conclusions from the research effort, and provides future recommendations.

116-83

SMALL COMPUTER APPLICATIONS FOR BASE SUPPLY

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

Patrick M. Howard, BS
Captain, USAF

March 1984

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has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirement for the degree of

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READER

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BACKGROUND

Introduction

Man has continually searched for better ways to accomplish tasks, not only those required to survive, but those necessary to prosper. The tools he developed enhanced his quality of life and augmented his physical and mental capabilities. At first, individuals were totally self-sufficient, but soon there developed individuals who specialized in a segment of societal needs. Through incremental developments and improvements in the tools available, these specialists provided benefits for a larger segment of the population and for a more extensive geographic area. This progress ultimately led to the need for managers who would "plan, organize, coordinate, and control" the "men, money, and materials" of the evolving organizations. By freeing their workers from mundane, menial tasks, these managers sought to improve operations, and thus promoted further tool improvements. Reductions were realized in materials, workers, and costs, while output increased. Throughout history, the development of various tools led to progressively substantial improvements and ultimately to today's "Information Revolution."

During this Information Revolution, the computer, a

multifaceted tool which has significantly improved man's abilities to accomplish tasks, has also played an increasing role in assisting the manager. As with other tools, the computer has been refined, improved, and enhanced. However, the computer as a system is little changed from its original concept. A computer system today is still composed of five principal components: (1) arithmetic/logic, for performing calculations and comparisons; (2) control, for executing the instructions it receives and for directing the other four components; (3) memory, for storing the numbers and the instructions for a given problem; and (4) input and (5) output units, for facilitating interaction between man and machine.

Computer Developments

While retaining these five basic components, computer operations have advanced markedly. Four phases of improvements, commonly referred to as "generations," have occurred since the development of computers in the 1940's. Each succeeding generation has brought about decreases in the size and relative cost of the computer, while concurrently increasing its capabilities and expanding the areas of applications.

The first generation of computers was characterized by thousands of vacuum tubes, making computers both expensive and large. These computers were confined to performing numerical calculations, were difficult to

program, and were limited in the space available to store data, which resulted in computers being restricted to only a few large organizations. They were used primarily to assist in the computation of slow, error-prone, and time-consuming scientific and engineering calculations. Because of these limitations, there were only 250 computers installed in the United States by 1955 (40:34).

In 1958, transistors replaced the vacuum tubes, allowing the first major reduction in computer cost and size. This event heralded the second generation of computers. These newer computers effectively demonstrated their ability to process "simple but high volume jobs at amazing speeds [41:25]," thus introducing the computer to business applications. These applications took the forms of problem solving, information gathering, and data reporting. Business applications first appeared in areas which were labor intensive, providing rapid cost reductions. For example, repetitive clerical operations such as payrolls, accounts receivable, and inventory records were computerized. By 1960, this growth in applications, coupled with reduced investment costs, had increased the number of computers installed in the U.S. to 3,900 (40:34).

Further technological developments once again dramatically reduced the cost and size of computers. During this third generation, creation of semiconductor

chips (small electronic components, made of silicon which combine many transistors) increased the capability to store data and provided faster processing times. This capability in turn allowed the development of general purpose computers with the ability to perform complex calculations and still provide massive data processing capability. These general purpose computers allowed additional organizations to realize utility from the application of computers, and thus many organizations purchased large mainframe computers for centralized data processing. Through the mainframe computer and large quantities of data, managers were provided many new applications. However, with the advent of an increased data base, managers sometimes received unnecessary, unwanted, and unusable listings. Eventually, the systems were revised to provide information which highlighted selected information only when certain parameters were exceeded. This selectivity greatly expanded the managerial applications and allowed the manager to use the computer as an aid. At this same time, the first minicomputers were produced, but they provided few practical applications because of their very slow speed and limited storage capabilities. By 1970, the number of computer systems had multiplied to 46,000 (40:34). The Information Revolution had become firmly established.

The latest advancement in technology, placing more

controlling elements on one extremely small semiconductor chip, called an integrated chip (IC), provides the fourth and most current computer generation. Today, a microprocessor is capable of performing more functions than a first generation computer of thirty years ago, yet it costs less than five dollars and is more than one thousand times smaller than the first computer. Advanced technology also allows computer systems to communicate with each other, while improvements in processing techniques allow large computers to process quantities of data which were unimaginable during the early years of computer development. Recent figures indicate there are now over 1400 areas where computers have applications (10). Although some of the applications are carried out exclusively by the more rapid large computers, small computers, limited primarily by their storage capability and speed, are able to assist these larger computers through their ability to accept and pre-process data. Because of these improvements, computer usage has grown exponentially. By 1980, some 1,100,000 computers were installed in the U.S., over half of which were small computers costing less than $5,000 (40:34).

According to some authors (30, 64), this most current generation offers a complete range of computer systems: a personal computer, a microcomputer, a minicomputer, a midicomputer, a maxicomputer, and a super

computer. This range of systems now allows the manager to select the system which best matches his budget, space, and application needs. The group of small computers (personal computers, microcomputers, and minicomputers) provides a new tool for managers. Computing power, once the singular domain of established data processing groups, is now directly available to any level of almost any organization.

Justification

Unfortunately, the Air Force currently does not seem to share the small computer growth experience of the business world (54). This research effort, therefore, addresses problems of availability and under-utilization of small computers in the Air Force. Before looking at specific Air Force small computer opportunities, though, one can justify this research by reviewing business world progress with small computers, exploring rationales for their use, and determining areas most suitable for small computer support.

Business World Experience

Managers are rapidly coming to recognize that substantial benefits can be achieved by having access to and properly utilizing small computer systems. The business world has already realized sizable cost savings, personnel productivity gains, and improved operational performance through small computer applications (60:12).

From the Chief Executive Officer (CEO) to the lowest salaried worker, businesses are assessing the unique advantages of the small computer and finding it valuable at all levels for managing their organization. Multinational businesses have reported savings of millions of dollars through the utilization of small computers, while smaller businesses have found similarly dramatic, though less substantial, results. Thus, the business community has taken the lead, capitalizing on the development of these small computers either to augment their large computers or to serve as individual systems.

Although small in size, personal computers, microcomputers, and minicomputers have not been limited to small businesses. Large firms, long plagued by the problems of centralized data processing, are purchasing many of these systems (45:77). For example, American Can Corporation had no small computers in May 1981, but it now has three dozen in the headquarters alone. Like many other organizations, American Can Corporation used their small computers to decentralize their computer operations, which "effectively improved the information for the end-user [7:62, 20:34, 59:407]." In fact, many organizations are transitioning from a single "computer system" to a "system of computers (37)" through the use of small computer networks.

Rationale for Small Computer Use

Companies like American Can Corporation purchase small computer systems for various reasons. The most commonly stated rationale for decentralizing into a system of small computers is the limited investment required to increase capability and improve productivity (7:62, 23:40, 59:44). Other cited reasons include decreased time for processing data (56:44), continued data processing capability when the large computer is out of operation, and reduced time spent on mundane tasks (31:5). Finally, small computers can analyze data in ways not currently programmed on many large computers (7:64). In what specific areas, then, can the small computer assist an organization?

Small Computer Support Areas

Small computer usage for managers generally falls into five major support categories: support of office duties, support of decision makers, support of large computers, support of graphic requirements, and support of training.

Of the office uses professed for small computers, by far the most widely acclaimed is word processing. Word processing provides the user the capability of entering communications, such as memos or letters, into the small computer, storing them, adjusting them, and printing them on command. Small computers may be programmed to print

selected standard paragraphs (69:78) or an entire letter, often making appropriate alterations, such as name changes on mass mailings (61:10). Electronic mail also becomes an important contribution of a small computer's office support capability. Here, information is disseminated confidentially through the computer from one user to selected others, or to "bulletin boards" and newsletters available to everyone, thus avoiding the traditional printed medium. Another office duty is maintaining personnel data, such as "records on account executives and their achievements, i.e., date hired and sales records, [27:37]," as well as other restricted data (31:3, 15:16). Finally, the office management task of maintaining files may be accomplished through the small computer rather than printed documents (42:120, 27:34).

Another advantageous usage for small computers is the assistance it can offer to decision makers. The key use is in providing answers to "what if" questions through the application of Decision Support Systems (DSS). Advocates of DSS claim the most significant benefits from small computers are derived through computer interactions with corporate managers. This interaction creates a synergistic relationship by enhancing decision making capabilities through the most desirable attributes of both man and machine (21:34, 30:158, 44:38). Gibson (30:497) describes a DSS system at First National Bank of Chicago

which has "reduced the cost of providing information to decision makers by over $100,000." Decision making may also be aided through packages which compute statistical information (35:48, 55:8). Finally, as an adjunct to these statistical packages, there are many programs available which provide simulation and optimization models as decision making tools (36:35, 56:44).

Large computer support represents the third area in which small computers may prove beneficial. For example, a small computer can detect errors in programs which, once corrected, may then be implemented on the larger computer, thus reducing the time required of the large computer (17:20). The small computers can also be used to process, manipulate, and/or translate raw data prior to submission to the mainframe (10:7, 17:20).

As a fourth support category, the excellent graphics capabilities of small computers enhance the transmission of information available to managers. Small computers offer a wide range of graphic capabilities, from providing a detailed replication of a picture to a generalized profile of a shape. Programs are also available which provide trend analysis through bar charts, histograms, or connected point plots (5:41-48).

The final category of small computer use encompasses the support of training efforts through Computer-Based Education (CBE). Training through small

computers may be accomplished in two manners. First, through Computer-Assisted Instruction (CAI), training is actually accomplished by the computer, which displays the course materials, tests the student, and accomplishes statistical analysis on the student's performance. A school in England found CAI instruction provided an improvement in the development of eight student's writing capability (47:483). The other manner of computer training is Computer-Managed Instruction (CMI). Through CMI the computer does not accomplish the training, it directs the student to appropriate learning materials, such as films, books and lectures. Then the computer tests the student and accomplishes statistical analysis on the student's performance (64:88).

From the foregoing discussions, one can envision the substantial time saving benefits of the small computer and the application of small computers to office duties, decision making, larger computers, graphics, and training. Now that this research has been justified in terms of current small computer benefits in the business world, what can be said about the status of small computer use in the Air Force?

Air Force Recognition of Small Computers

The Air Force has recently realized the potential offered by these small computers, especially in the areas of cost reduction and improvement of management

capabilities. This realization has resulted in the creation of the Small Computer/Office Automation Service Organization at the Air Force Data Systems Design Center, the Small Computer Offices at some major command Data Automations, and the Small Computer Office at the Air Staff. These offices are responsible for providing technical assistance and guidelines to users and accomplishing studies on small computers. In 1981, Headquarters United States Air Force, Supply Policy and Energy Management Division (HQ USAF/LEYS), requested all major commands to provide opinions on the use of minicomputers in Base Supply (49:1). The Air Force Logistics Management Center is also realizing small computer benefits and is studying the application of small computers in the major logistics arenas. Such applications include reading bar-coded information on receiving documents, collecting and pre-processing data for the Vehicle Integrated Management System (VIMS), and speech input of Maintenance Data Collection System information (32).

Major Command Applications

In addition to the preceding examples, every major command now utilizes small computers to some extent, although they are normally located only at the headquarters level (34, 36, 40). In one such application, Headquarters Air Training Command (ATC) installed a small computer for

use by their five logistics directorates. They have increased the number of application programs by 25 per year, establishing a total of 233 programs by 1983. Typical uses have been to prepare their two monthly logistics publications, to produce charts for data which exceeds statistically established control limits, to evaluate the efficiency of base supply management at each ATC base, and to control the TDY program for the directorates (12:7).

In another major command application, Strategic Air Command's (SAC) small computer has been utilized to track manpower variables for the logistics areas, to compute trend lines, to prepare statistical analyses and their accompanying graphical displays, and to perform simulations of wartime scenarios for contingency sortie generation (12:7).

A third application example comes from the Directorate of Cost and Management Analysis at Headquarters Military Airlift Command (MAC), where MAC recently installed a small computer to aid its managers. Applications include:

(1) analysis of possible changes to the Airlift Service Industrial Fund, which was formerly done manually on calculators;

(2) analysis of two methods of computing travel vouchers, which was accomplished in 60 hours by a

minicomputer versus over 200 hours projected for a manually prepared analysis (50:37).

Base Level Applications

In contrast to the preceding major command applications, the Tactical Air Command (TAC), in conjunction with United States Air Forces in Europe (USAFE) and Pacific Air Forces (PACAF), initiated in 1981 the most aggressive program to place small computers at base level. This project is aimed primarily at assisting flight crews in developing calculations for flight planning (13:4). The Air Force Comptroller installed small computers at five base level comptroller activities for the "Base Level Comptroller Improvement Program (BLCIP)," which studied the application of small computers to 19 tasks being accomplished manually (54:1). Consequently, one can see that while the small computer has made definite inroads, it is still not widely available to many of the base level organizations.

Problem Statement

This author believes that managers at base level can benefit greatly from the capabilities and applications of small computers. To investigate this premise and study the application of small computers to task accomplishment, this thesis considers one important area of Air Force operations, Base Supply and its Standard Base Supply System

(SBSS).

The Base Supply organization is relatively complex, and is made up of six semiautonomous yet highly interdependent branches. The operations of the organization are facilitated by a second generation UNIVAC 1050-II computer. Installed at Air Force bases in the mid 1960's, the UNIVAC uses procedures defined through the SBSS. The SBSS provides inventory control, order processing and sales, and financial data through programs centrally developed and controlled by the Air Force Data Systems Design Center (AFDSDC). The functions performed and the standard information formats provided by this system are, except in limited instances, beyond the direct control of the base level manager, thus limiting its usefulness.

The Air Force is currently in the process of replacing these UNIVAC 1050-II computers with "state of the art" UNIVAC 1100's. This new system is a large central computer augmented by microcomputers for input and output. Additionally, the system can interface with other small computers provided they meet specific standards. However, this replacement system will be programmed to continue current SBSS operations, and as presently specified, will provide only one enhancement---word processing. The Air Force Data Systems Design Center believes that future development of the new system's potential capabilities are

many years in the future (68).

Although supply managers currently have access to a mainframe computer, it is not a "complete" tool. The UNIVAC systems (1050-II or 1100) have both been programmed for specific purposes, but they are not necessarily programmed to provide information the manager may want or require. In some cases, the systems have not been programmed to provide certain types of information, although the capability exists. In other instances, the systems simply are not capable of providing the required information. Because of these computer system limitations, there are many tasks in Base Supply which must be accomplished manually. Provided below are examples of tasks which are not computerized.

(1) The Chief of Supply needs to shift the "target monies" allocated to the branches under his control. This is usually accomplished by manipulating written figures on a tabular sheet and calculating remaining balances for each iteration. If a graph of these budget targets is required, the data must be manually collected and computed, while the graph must be prepared by using scissors and tape.

(2) When the Executive Officer needs a list of individuals in the grades Staff Sergeant and below, someone must manually search a card file, determine if criteria are met, then prepare the list.

(3) The Customer Support Officer and the

Management and Procedures Officer are responsible for conducting an analysis of the Customer Liaison Office (CLO) call-ins received during a given month. This requires a review of each CLO work sheet to gather the necessary data. Normally, this is accomplished by listing the specific information required, recording each occurrence by a "hash-mark," counting the number of occurrences, and analyzing the data. Since the data collection process alone can take many hours, the data analysis is often only a list providing the number of occurrences.

(4) The Material Storage and Distribution Officer is responsible for maintaining files on materials relating to Communication/Electronic/Meteorological (CEM) scheme projects for base organizations. Messages with standard information must be sent to acknowledge receipt of property for the project. Warehouse locations, on-hand balances, and the standard information included in the receipt acknowledgement message must be maintained manually for each set of property received for the scheme project.

(5) The Fuels Management Officer is responsible for monitoring the variance of fuel truck off-loading meters. The meter readings are recorded daily for all trucks, and an individual calculates the variance between the off-loading readings and on-load recordings. Those variances outside of set limits are reported to the appropriate manager to remove the truck from service and to

recalibrate the meter.

(6) The Material Management Officer is responsible for monitoring supply items which affect weapon system mission capability (MICAP). This requires contact with the item manager and/or system manager for the MICAP supply item. Normally, each individual in the MICAP section maintains a list of item/system managers by depot, system supported, or Federal Stock Class (FSC). When a new telephone number is identified for an item/system manager, the individual who learned of the change will often update only their own personal list.

(7) The Management and Procedures Officer is responsible for monitoring the progress of supply specialists on upgrade training. When results of Career Development Course (CDC) tests indicate areas in which an individual requires additional training, such training is accomplished by re-reading the CDC material and/or discussions with qualified individuals in the same career field.

(8) The Supply Systems Officer is responsible for monitoring AF Forms 86, "Requests for Cataloging," which have been sent to the cataloging center. This requires submitting the AF Forms 86, establishing a suspense file for follow-up of unanswered AF Forms 86, and submitting and monitoring follow-ups. Follow-ups must contain much of the same information as the original AF Form 86 and must be

typewritten.

Research Objective

The objective of this research is to examine the feasibility of accomplishing such routine base level supply tasks through the use of small computers and commercially available software, and whether such tasks may be accomplished faster and more accurately.

CHAPTER II

LITERATURE REVIEW

This chapter provides introductory comments on small computers and their impact on society, and a literature review which expands the information provided in Chapter I. The literature review provides information on productivity enhancements, additional data processing capability, small computer uses, and small computer problems/limitations.

Introduction

Since their arrival in the 1940's, computers have increasingly come to influence the daily activities of individuals. Commercial aircraft movements are monitored and controlled by computers. Stop lights are coordinated to insure steady flows of traffic. Defense strategies are tested by computers to indicate flaws in the planning processes. However, the direct "one-to-one" interaction between man and machine remained limited until the development of the microprocessor, which availed the small computer to almost any individual or business. Since 1980, when 724,000 small computers were sold (29:14), the number of small computers sold each year has approximately doubled. In 1982 alone, over 2.8 million computers were sold at a total value of over $4.9 billion (29:14). Himrod

(35:44) predicts that of the small computers to be sold in the U.S. during the 1980's, 80 percent will be for business applications. Why is the business world spending such a large amount of money on small computers? What can a small computer do for a business? What are the advantages of small computers? What problems have small computers presented?

This literature review answers such questions and expands the information provided on small computers in Chapter I. Materials were collected from the Air Force Institute of Technology (AFIT) Libraries, Wright State University Library, City of Dayton Library, the Defense Logistics Studies Information Exchange (DLSIE), the Defense Technical Information Center (DTIC), and other sources. Because of the rapid developments in the computer field, periodicals were limited to those published after 1978 and books were limited to those after 1975.

Why Purchase a Small Computer?

Productivity

The key rationale cited in the literature for purchasing a small computer was productivity enhancement, especially for white collar workers. A study conducted by Booz, Allen and Hamilton (29:18) noted "office professionals could save 15% of their time if they used the /computer/ technology /then/ available." Much of this time

saving results from using the computer to accomplish mundane tasks. Adams (1:40) believes that with a small computer:

> Tedious manual tasks become very tolerable; the time required to get it done is dramatically reduced, efficiency improves, and probably the information is greater.

In an example cited by Levielle (45:34), an insurance company converted their manual card system of client information on to a small computer. Subsequent work was accomplished 45% faster and was 75% more accurate. A manager of the company observed, "The system is easier on the clerical staff, /and/ it decreases employee turnover."

Because the small computer allows individuals to accomplish routine tasks better and quicker, more time is available to pursue other opportunities. Viet (69:78) explains that the computer frees managers to deal with "exceptional problems and to actually manage the firm." Finally, Burnett and Boatright (12:6) believe that small computers have helped managers gain better control of their operations. Many organizations recognized the productivity potential of computers early in the computer's development. Therefore, they have large, centralized computers, controlled and operated by a data processing (DP) activity. Even with this computer power, organizations are also purchasing small computers, because they recognize the need for additional DP capability.

Additional Data Processing Capability

An editorial in the Government Executive (23:40) stated:

> Modern computer technology is making it cost effective and desirable to decentralize both application development work and computer operations by distributing equipment throughout the organization in the form of minicomputers and small business systems located in individuals offices. This is among the most promising technological phenomena from the standpoint of upgrading Federal data processing operations. Many of the problems agencies face today are directly attributable to excessive centralization in the operation of data processing facilities.

This editorial illustrates the most common problem faced by organizations having only centralized DP activities. Such organizations face a substantial time lag for developing functional department computer applications. Many DP activities have 2 to 3 years of backlogged projects because users want more automated systems to help them keep up with their increasing workloads (16:16). According to a computer system manager, "70% of this backlog consists of applications that could be developed by the user with a small computer [42:116]." Small computers are being used in this manner at Pesi-Cola to develop application programs for the finance branch. In addition to faster application development, the user found that the small computer gave "much more flexibility" in developing a program to match the need (56:44).

This additional DP capability also allows the organization to increase their computer availability and

reduce the workload of the central computer. J.C. Penney Company installed twenty-five small computers to lighten the workload of their New York office's DP operation. The systems were "well-received" by the user. With the small computer, numerous applications became available which had not been requested previously because the central computer was over-tasked. In addition, the small computer systems yielded "higher quality data because the user also acted as the system analyst [67:173]." As the system analyst, the user reviews the information available, the input parameters, and the output requirements. Since there is no communication between the user and the system analyst, there are fewer misunderstandings. Thus, small computers are purchased to increase productivity or to reduce the strain on the centralized DP activity. But once the small computer has been purchased and is operating, what applications can the organization expect with the system?

Small Computer Uses

A small computer is used in a myriad of ways. For the purposes of this literature review, I have elected to divide the possible uses into five major categories, which include decentralized computer power, decision making, office duties, graphic presentations, and training.

Decentralized Data Processing

As the title implies, small computers allow data

processing capability to be distributed, or decentralized, to the user's work area. There are three manners in which the small computer accomplishes decentralized data processing: by acting as a stand-alone system, by linking with other computers (networking), and by taking over some mundane mainframe tasks (front-end processing).

Stand-Alone Small Computers. Since computers up through the third generation required a large capital investment, most organizations were limited to a single large mainframe computer with restricted access and control. However, today's small computer is allowing the user to have direct access to computer support through distributed data processing (DDP). DDP is concerned with "decentralizing" computer power, which the small computer can provide through its operation as a "full-fledged" stand-alone computer system, albeit a small one. As explained in Chapter I, all computers have five functions: arithmetic/logic, control, memory, input and output. Each one is represented in a small computer and thus can be available to the lowest level of an organization. As a stand-alone system, the small computer can accomplish each use described in this chapter. However, the user must be aware that there are limitations due to the size of the small computer's central processing unit (CPU) and memory.

Networking. This technique allows small computers located at the user's work area to be linked with other

computer systems, large or small. Although these systems are physically separated from each other, they are able to interact with each other through telecommunication.

There are many variations to the mix of large and small computer systems in a network. These networks may consist of only small computers linked together, each containing a specific set of data, known as a data base, which can be accessed by other small computers. Networks may also link many small computers to a mainframe which contains the data base for the entire network to share. The primary advantage of a shared data base, according to Cicio (15:117), is that:

> All functional users in the organization share the same information without proliferating numerous copies of documents. Each user who draws from the data base can manipulate the same facts and display them in the particular format required for an operation without creating a separate file. This means that engineering information, production statistics, logistics history and deliver information can exist in a common location, and any office plugged into the network can have access to all or portions of the data base without separate files of information.

Front-end Processor. When a small computer is networked with a mainframe computer, the small computer is referred to as a "front-end processor."

Software packages transform the small computer into an "intelligent" input/output device for the mainframe. As an "intelligent" input/output device, the small computer accomplishes many of the mundane tasks, which according to Adams (1:120), "should not be accomplished by the

mainframe." This includes data entry, editing, software debugging, printing, or "other non-computationally bound operations [1:120, 17:207." The small computer augments the mainframe by providing data entry and editing capability. Viet (69:78) describes this capability as a "data collection station within a distributed process network."

Software packages for data entry provide "menus" which allow the user to interact more easily with the computer by not requiring him to remember specific formats. Normally, entry formats require information to be placed in a certain location of the input fields. By means of a menu, the computer software moves the user through several input choices to the specific one required for the data to be entered. Once the specific entry format has been accessed by the user and data entry has started, the software packages then provide edits of the data's format. These editors can be programmed to look for either alphabetic or numeric characters by each "card column" or for a group of columns.

For example, the Worldwide Keypunch Replacement Program (WKRP) for a front-end processor allows the user to establish a file, define the input fields of the file, and establish the edit feature for each field. WKRP allows the user to redefine the edit features at will and provides error messages describing the type of data character which

must be input for correct acceptance. Once the data has been accepted, the small computer may accomplish a variety of pre-processing tasks or may forward the data directly to the mainframe. Small computers may be programmed to accomplish any or all of the following pre-processing tasks prior to sending the information to the mainframe: calculations, storage, printing, statistical analysis, and digitizing (translating from the decimal number system to another system, such as binary) (69:78).

Union Oil of California installed small computers as front-end processors at all of their field offices. These small computers perform functions such as digitizing raw data, high-speed transfer of digitized data to the mainframe, retrieval of analyzed data from the mainframe, and plotting or printing the results at the location (1:173). With this capability, the field geologist can collect data, convert them into the proper format, edit where necessary, and print the results at the site. Union Oil officials believe the installation of the small computer has "paid for itself by reducing line charges and CPU input/output time," while "greatly improving data collection and reduction [1:173]."

Decision Support Systems

Another highly important use of the small computer concerns its ability to provide managers with timely, relevant information. Many decisions made by managers are

required quickly and often with limited information. Many times the information is available, but it is not rapidly accessible. Decision Support Systems (DSS) assist the manager find the necessary data, translate the data into information, and then aid the manager in making a decision based on the information.

Historically, DSS received its genesis from the creation of computerized Management Information Systems (MIS). Kelly (41:5) describes MIS as:

> The combination of human and computer resources that result in the collection, storage, retrieval, communication, and use of data for the purpose of efficient management of operations and for business planning.

Thierauf (66:3) adds that an MIS "provides the manager with that information he needs to make decisions." Although MIS allows access to information required for decision making, DSS enhances three aspects of an MIS: retrieval, communication, and use of data.

Besides MIS enhancements, Gibson (30:494) further identifies DSS as "a human/machine information processing system specifically dedicated to effective decision making." Lasden (43:156) develops this human/machine interaction by stating, "DSS provides users with an effective way to get information without intermediaries." This means that DSS software allows the manager to interact/communicate directly with the computer system, to obtain data required for decision making, and to manipulate

the data in various manners to provide information.

Through DSS software, managers can ask "what if" questions, process quantitative models, and create reports to obtain information. The decision support system capability most often addressed in the literature is the ability to test different alternatives, i.e., to answer "what if" questions.

Electronic Spread-Sheets. A popular set of commercially available software packages developed to answer such "what if" questions is the "electronic spread-sheet," such as VISICALC, SPECTACULAR, and SuperCalc. Through these packages, the manager can create and manipulate elements contained in a two-dimensional data grid composed of rows and columns, such as months by budget areas, or organizational divisions by personnel strength. In essence, these "electronic spread-sheets" have replaced the calculator and columnar pad for managers in many organizations. These packages allow the user to place an arithmetic operator, numeric value, label, or formula anywhere in the grid.

Through the "what if" capability of the software, the manager can modify any of the grid locations, then request a recalculation of each element in the grid affected by the modification. Lay and Ellis (44:38) state, "One of the most important capabilities offered...is the possibility of rapidly exploring the consequences of

alternative decisions." Since these modifications can be "accomplished quickly without losing the original base case," the manager is constrained only by his imagination. The following examples demonstrate some interesting applications of electronic spread-sheets:

(1) The broad appeal of these electronic spread-sheets is presented by the manager of American Can Corporation's Micro Center who states, "VISICALC alone drives people to buy a microcomputer [7:64]." Supporting this premise, VISICALC is currently the largest selling single software package in the United States, with recorded sales of 400,000 packages (14).

(2) Electronic spread-sheet packages save time for managers when recalculating the outcomes of alternative decisions or criteria (7:64, 29:16, 50:37, 56:42). For example, a vice president of Transamerica Corporation analyzed various proposals in a $300 million acquisition. This analysis provided him a "good feel for the critical numbers," and allowed him to "work through alternative options [29:16]."

(3) A small oil well drilling business uses a small computer with an electronic spread-sheet to calculate bids for possible contracts. By using the spread-sheet, a manager can make numerous ten year cash flow projections by varying the days of utilization per year of the oil drilling equipment, or varying money costs and investments.

These computations were previously accomplished with a calculator and a columnar pad. He noted, "The small computer provides so much greater facility for this sort of analysis [56:42]."

(4) At the office of Comptroller, Management Analysis, HQ MAC, analysts are now able to conduct analyses which determine the effect on the Airlift Service Industrial Fund (ASIF) tariff rates by changing one or a combination of the factors used to establish the tariff. In fact, they believe their ability to conduct "what if" studies has "been greatly increased because...the machines will recalculate the numbers...quicker and more accurately [50:37]." This provided them with the opportunity to conduct analysis projects "with a much greater depth of analysis [50:37]."

The software packages used in some of the electronic spread-sheet applications above are also used to monitor cost data, especially for budgets. For example, a manager at a drink manufacturer uses VISICALC for the budget of nine departments, while at a television studio, another manager maintains the budgets for each of his correspondents and monitors monthly expense reports of each correspondent. The grid arrangement allows them to quickly identify if there are any problems, to identify who is causing the expense, and to identify what areas of the budget cost more than planned for (56:44).

Quantitative Models. In addition to electronic spread-sheets, DSS also included quantitative models, which are useful in statistical analysis and operations research problems. Because of their complexity and the knowledge required to create quantitative models, the use of these software packages is not as well documented as other DSS packages. However, their utility is just as important. Statistical evaluation techniques through quantitative models were most frequently mentioned in the literature. The packages available provide the ability to perform regression analysis, variance analysis, statistical sampling, sensitivity analysis, correlation, chi-square, and expected value probabilities (2:141, 35:44, 50:37). Analysis data for these packages may be provided by direct entry of the user, by interfaces with other software, or by accessing stored data bases. Once the data is provided, the software provides a menu through which the user may select the type of analysis desired. With statistical packages and accurate information, the manager should appreciate time savings as noted in the following two examples:

(1) Two methods of completing travel vouchers were evaluated by HQ MAC to determine the statistical relationship between a new method of preparing travel vouchers and the one currently in-use. Using a small computer, travel voucher computation time, audit time, and

error rates were compared for approximately 1,300 paid travel vouchers. This analysis took approximately 60 hours, versus an estimated 200 hours if it had been accomplished manually (50:37).

(2) The vice president of a pharmaceutical laboratory often used the services of a statistician to accomplish statistical analyses. After the statistician received the data, the results of the analysis took several days to accomplish. However, using a small computer with a statistical analysis package, he found that he obtained the same results, but in minutes versus the days required previously (33:222).

These statistical software packages indicate their ability to reduce the time needed to accomplish evaluations for the manager. Equally important to decision makers are packages designed to support the manager in Operations Research (OR) problems.

Some software packages available for OR problems are VISISCHEDULE, ECONOMIC ANALYSIS GROUP, and PRODUCTION CONTROL GROUP. Such packages allow the manager to establish optimization criteria, define mathematical operations, and identify constraints in linear programming or transportation problem models. Other packages forecast time-series data utilizing Winter's or exponential smoothing models, while still others monitor projects through Project Evaluation and Review Technique (PERT) or

Critical Path Method (CPM) (2:342-387). As with electronic spread-sheets, the user is allowed to manipulate any of the criteria, mathematical operations, or parameters to test alternative situations.

As one example of small computer OR applications, the marketing manager of a consumer goods manufacturer uses a small computer to provide the company's market forecasting model, even though a mainframe is available. The model typically forecasts monthly sales within 5% of the actual sales for the period. As another example, an accounting/auditing firm purchased a small computer to replace a service bureau's time-sharing modeling package. The small computer is slower, requiring 10 minutes to 4 hours to process some models. However, the cost of the entire small computer system ($10,000) was lower than the charge ($20,000) for a single modeling by the service bureau (43:166).

Office Support

Obviously, use of the small computer can literally transform the manner in which business operations are conducted. Moreover, the small computer has had an especially strong impact on office operations. With the introduction of microprocessors, the equipment in the office is rapidly changing, so much so, that Spencer (64:453) indicates "office equipment advanced more in the past ten years than in the preceding five thousand."

Typewriters are no longer limited by the speed of the typist, the spelling ability of the author, or the strength of the carbon paper. Filing cabinets filled with yellowing, wrinkled, and blurred pages may be replaced. Telephones may accomplish the tasks of "conference calling, call-forwarding, automatic dialing, automatic redialing of busy numbers, and last number redial, through the use of computers-on-a-chip [64:453]." In other words, offices are being automated. Cicio (15:16) defines office automation as:

> The use of state-of-the-art automated information processing technology to form a synthesis of people, procedures, and software /programs/ to achieve improved communications and productivity.

Cicio (15:16) contends that office enhancement is overdue and that supporting the office through automation is the key to improving operations. He cites as benefits of automating office support "an increase in the efficiency of communications, increased responsiveness, reduced travel costs, and standardization of operations." Small computers provide support by automating the functions of an office in four ways: word processing, records maintenance, electronic mail, and teleconferencing.

Word Processing. These software packages are based upon the capability of a computer to store data in it's memory, retrieve and manipulate the data quickly, then store it in its adjusted form. When a computer is used for

word processing, the data are the letters and numbers which in sequence create words, sentences, and paragraphs for communication between individuals.

Through available software packages such as WordStar, SuperSCRIPSIT, and MEMORITE III, most small computers will provide word processing capability. Word processing software allows the user to input and store correspondence in a file in the computer's memory. There are three main features in most word processing packages: adjustments, checks, and printing.

The ability to adjust documents quickly and easily is considered the prime advantage for using the small computer as a word processor. This feature of the software packages allows the user to add, delete, or replace letters, numbers, or special characters at will anywhere in the correspondence file. This allows a change to be made, without totally retyping the document. One journalist found this capability to be "a big help in editing and rewriting scripts [56:44]." A school teacher believes that "the quality of papers improved because students are willing to make changes" with the availability of a word processor (3:23).

Not only will word processing packages allow for changes, many of them will proof read the document for the user. Through built-in edit functions, many errors can be detected by the computer rather than the user. Most

packages include a dictionary which identifies and/or corrects misspellings. There are packages that include phraseology functions which provide information on active and passive verb usage and whether there were errors detected. Occasionally, a thesaurus is provided. The computer is programmed by the manufacturer to select words or word sets which are considered poor word choices/combinations, and provide alternatives for those it identifies. These functions are faster than a human, have greater success in detecting errors, and release the individual to accomplish other tasks.

Once the changes have been identified and corrected, the last feature of a word processing package is printing the document. In printing the file in hard copy, word processing packages once again provide a number of different possible options. Through commands given by the user, the computer directs the printer on margin width, centering of words, bold face, italics, and page numbering. For ease of editing, the document may be produced in double or triple space. Form letters may be personalized and prepared as original documents. Several authors (23:5, 61:10, 68:80) recognized the potential of selecting only specific paragraphs from "stock forms to customize the document," which can "eliminate all of the irrelevant material that does not apply to each person." The Navy applies this feature in preparation of messages for supply

parts, selecting appropriate paragraphs from standard formats (61:10).

Records Maintenance. Although word processing is "already in wide use [23:5]," the small computer is gaining recognition in other office support duties, including records maintenance. The records maintenance software packages provide users with "electronic file drawers, folders, and pages [42:120]" in which the finalized documents may be stored rather than on paper. These files "can be searched by a [small computer] system based on names, dates, or key words [31:3]," allowing the user access to information which best fits the intended use. Many of the software packages provide "an electronic waste basket that holds discarded documents, which can be retrieved until cleared by the system [42:120]." By using the small computer for this purpose, office personnel save time in searching, replacing, and copying filed information. An insurance salesman used this feature to replace three different four-drawer file cabinets with several 5 and 1/4 inch floppy disks. He now accesses the client files by their name, whereupon the small computer provides information of the person's coverage. He states, "This application saves me a lot of refiling time [27:34]."

Ferrarini (27:37) cites another records maintenance illustration. He notes the case of a brokerage firm's marketing development office which maintains files on

branch offices in a small computer. This office maintains records on account executives and their achievements, including such information as the date they were hired and their sales records. The software packages used can search and compile a report based on any desired selection criteria. For example, "the computer can compile a report of all the account executives in the southwest region who have produced a certain amount of business within certain time periods [27:37]." The manager of the office states, "[The small computer] allows us to add and update records and to print reports while saving us a tremendous amount of time [27:37]."

Teleprocessing. In addition to storing information for an office, a small computer may allow a new medium of communication---teleprocessing. Through teleprocessing, one computer is able to send and receive information to and from one or more other computers. The computer stores the information until the user or intended receiver is available to view it. The user may then view the information on a visual display unit (VDU) or print a copy. Depending on the need, the information may be removed or stored for future reference. The literature described two means where this capability could enhance office operations: electronic mail and teleconferencing.

Electronic mail is "substituting electronic media for paper processing [28:513]," including memos, letters,

and reports. Husbands (38:6-7) describes the typical software packages as follows:

> Electronic mail systems offer each user an electronic mailbox to which any other system user can send personal messages, via computer terminal and telephone interface. No one but the user has access to the contents of his own mailbox. In addition, they may offer a bulletin board to which special interest messages to many system users can be posted and read by members having access to the bulletin board.

This type of system can be accessed by users only within a specific organization or can be accessed nation-wide. These nation-wide systems include commercial systems, such as "The Source" or "Micronet," and Department of Defense systems, such as "Arpanet" or "Dial-A-Log."

After accessing one of these electronic mail systems, the user creates the communication, perhaps using a word processing package, and enters it into his terminal or small computer. The user then directs the message to the recipients or to the bulletin board. Several advantages result from this method. First, by using an electronic mail system, messages are provided exactly as transmitted, without omissions. Second, Horton and Sholl (36:35) believe that electronic mail is "particularly useful when working over long distances.../because/...information can be transmitted /by a small computer/ faster and cheaper than with express mail." Moreover, since messages are transmitted immediately, there is no loss of time "in the distribution system." Finally, as all messages are stored by the computer, the chance of missing notices is

diminished.

A second enhancement of office operations, teleconferencing---is a by-product of electronic mail. The editors of EDP Analyzer (23:5) explain the teleconferencing concept thusly:

> A group of people can hold a "conference" over a wide geographical area and at different points in time. A member just logs into the conference and automatically obtains all messages that have been entered since his last session. The member enters any contribution he wishes to make and then logs off.

Husbands (28:6-7) notes four elements in utilizing a teleconferencing system:

> 1. A private mailbox for each person participating.
> 2. A "Conference Table" bulletin board accessible to all participants. Objectives, rules, ideas, and discussions are posted to this bulletin board.
> 3. A terminal must be available to each of the participants to allow him to enter and use the electronic mail system.
> 4. A non-judgemental moderator who is responsible for conducting the discussions and through whom controversial issues can be placed on the electronic Conference Table.

Husbands further recommends anonymity for the members, which allows them "to focus on ideas and not the personalities of those offering the ideas." He also notes "that teleconferencing allows for limited interruptions of a person's normal schedule," and that since "written messages are shorter and more to the point, they may result in clearer, more effective contributions." Finally, he observes that "electronic mail sessions do not require the physical presence of the participants, so the costs of

travel per diem and facilities are avoided." Thus, it seems that teleconferencing through small computers may provide a new avenue for exchanging ideas, without many of the current restrictions.

Graphics

The fourth major category of small computer use, graphics, relates closely to the second major category, Decision Support Systems. At this point, it is important to understand how graphics capability can enhance DSS. Undoubtedly, DSS has reduced the time required to acquire information. However, the manager is often provided so much information, that it is not useful. Industrial Management and Data Systems (5:40) observes:

> For the manager who wades through voluminous printouts, the display of graphics can consolidate data from multiple sources and focus attention on significant facts and figures.

Also, Lay and Ellis (44:38) believe that "much more information can be displayed in a coherent way through the use of computer graphics."

Data Presentation. The first application of graphics mentioned in the literature is the visual translation of data into graphics. Data may be provided to the graphics packages by direct entry of the user, by interfaces with other software, or by accessing stored data bases. After the data has been provided to the software packages, the data can be condensed and produced in

numerous formats (5:42).

Many of the small computers and software available allow the user to display the data charts in color. Some hardware/software combinations provide up to 16 colors, however, the norm is four colors. When considering the aspect of color, Industrial Management and Data Systems (5:42) stated that color may be used to "exaggerate small differences and to identify points of interest." While Lay and Ellis (44:39) note:

> Shading or color coding to represent the range of a variable can also be graphically satisfying, and may be at least as easy to interpret. One can rapidly take in areas of color in a display, so the amount of information assimilated may be many times that of a monochrome /single color/ display.

Most packages produce three families of charts from data: pie, bar, and x-y line. The packages normally allow segments to be color or hatched, variables to be labeled, and charts to be titled. Once the type of display is established, the software allows the chart to be displayed on the computer screen, printed, or both. Lay and Ellis (44:37-38) state that the key feature of translating data into graphic displays is "that managers are used to interpreting such plots, and so easily appreciate this kind of presentation of data." Not only are small computers able to produce graphical representations of data, they are also capable of creating other visual images.

Visual Designs. The simplest forms of graphics software packages, such as TURTLE or APPLE-PLOT, allow the

user to tell the computer how to create a design. By English-like commands entered through the keyboard, the user creates the shape desired by moving from position A to position B on the display screen. Other packages allow the user to simply define the shape required and its size. However, some packages require the use of specialized input devices, such as light pens, tablets, joysticks, or trackballs, to create the image.

Light pens and tablets are similar, in that both use a pen-like stylus to identify the points to be used in creating the image. Light pens are placed directly on the VDU, whereas tablets are separate units attached to the computer system. The user points the stylus at two or three points on the VDU or tablet. The user then tells the computer what shape to create from those points, such as two points, to create a line or a circle; or four points, to create a square or a rectangle. The stylus may also be used to trace existing designs or to draw freehand designs. Joysticks and trackballs, also attachments to the computer system, control the movement of a cursor on the VDU. The joystick, resembling a toggle switch, moves the cursor when the user moves the stick left/right or up/down, while the trackball is controlled by a ball set in a holder, which senses the direction the ball is moving. The user identifies the point by depressing a button on the units.

Through these systems, the user may create any set

of shapes desired and in any combination, such as squares in squares, circles intersecting squares, line tangents, or triangles. Most hardware/software also allows the user to define colors for each shape, while others may allow three-dimensional displays. When the user has defined all the characteristics of the design, it may be stored on a floppy disk for future reference or use.

One such use is Computer-Aided Design (CAD). Here, the user may be provided "standard" designs or create the designs required for his particular need. The designs may then be called up for adjustments or improvements. CAD software allow the user great versatility in designing objects. The user may view the object in three-dimensions, with or without "obstructed" lines in view. The object may be revolved front to back, top to bottom. The object may also be moved distant or close, with the ability to zoom in on a specific area. Some packages allow the user to measure the effect of stress on components of the object (5:42).

Certificates. The final use of small computer graphics combines word processing and graphics. This combination allows the user to create a variety of certificates and briefing charts. These packages allow the user to change fonts, to adjust character height, to add designs, to change colors, and to enhance or emphasize items of interest. This capability has been used by HQ

AFLC for the past three years to create Certificates of Appreciation and other awards quicker and with more professional results than by using standard Air Force forms and a typewriter.

Training

Training benefits comprise the last major use category. By combining the ability of the memory unit to store information, and the logic unit to compare and then react, the small computer can be an educational tool. Small computers aid instructors through Computer-Based Education (CBE) and information storage and retrieval. Computer-Assisted Instruction (CAI) is the first method of CBE, which uses a small computer to educate the student.

Computer-Assisted Instruction. In CAI, the computer stores the course materials, with questions and answers on the material. Software packages, such as PLATO and Author I, use this information to interact with the student. When the student has selected the subject to study, the computer retrieves the learning materials and allows the student to read the material at his own pace. Once the student has read the material, the computer displays questions, the student selects his response to the question, and the computer compares that selection to the correct answer. If the answer is correct, the student may elect to progress to additional material, return to earlier material, or end the lesson. When an incorrect answer is

chosen, the software may allow the student other options. This can include returning to the course material for re-reading, submitting another response, requesting an explanation of the correct answer, or ending the lesson. Many CAI programs accumulate data on student responses, diagnose student performance, and prescribe additional lessons (47:246, 53:47, 64:82).

Computer-Managed Instruction. Computer-Managed Instruction (CMI) is another form of CBE, although the actual instruction is not provided by the computer (53:47). According to Spencer (64:320), a CMI system has three objectives:

1. Collection and processing of student information.
2. Information available for instruction.
3. Supplying this information to the teacher in summarized form.

Through CMI software, the computer oversees the student's instruction and directs him to instruction materials available on the subject, such as films, books, and lectures. On completing the computer assigned instruction materials, the computer provides a test, scores the test, and interprets the results. The computer informs the student of his performance, what assignment is next, and the next assignment's location. The computer also manages student records, instructional resources, and administrative data for the instructor.

Organizations worldwide are using small computers

to instruct students on a broad spectrum of subjects. A report containing speeches presented at an education symposium described the following applications of CAI and CMI. A university in England is attempting to enhance creative writing skills (47:483). The Chinese are instructing students on the computer programming language BASIC (47:245). An American university uses a small computer to instruct several subjects and the computer language BASIC (47:397). Secondary schools in France use CAI to assist the teaching of English (47:93). Some CAI training packages have been developed, which explain how to use the other software packages, including VISICALC, WordStar, and other popular software.

The Department of Defense (DOD) also uses both CAI and CMI for instructing students. Through systems developed for the Air Force and the Navy, students are instructed in technical subjects based on their future work assignment. Orlansky and String (53) compiled the results of 48 cases conducted for the DOD since 1968. Student achievement for 40 CAI programs was superior in 15 cases, the same in 24 cases, and inferior in only one case. The study of eight CMI programs found student achievement the same in all of the cases. The amount of time saved by using CAI and CMI compared to conventional instruction ranged from -31% to +89%, with a median value of approximately +30%. Orlansky and String also compiled

information on studies dealing with cost effectiveness and stated that CBE could provide cost avoidances of $13 million per year for the DOD. They also noted the following benefits which often occur with CAI or CMI:

1) Provided more precise data for improving and updating course materials.
2) Improved control over equipment, facilities, and instructional materials.
3) Improved allocation of resources among students.
4) Improved ability to accommodate fluctuations in student loads.
5) Reduced instructor-to-student ratios.
6) Reduced need for support by non-instructor personnel.
7) Improved utilization of instructors.

In general, then, the CBE focus is on the computer instructing or assisting the student. However, the small computer can also support the instructor as a test proctor. As a proctor, the small computer is provided the set of questions to test the student's aptitude on the material. The software available provides the question, stores the student response, monitors the time remaining, grades the responses, and provides the information to the instructor and the student. Educational Testing Service believes that this type of testing provides reductions in printing and shipping costs and in printing and distribution lead time, while at the same time allowing for easier customization of tests (1:173).

Small Computer Limitations/Problems

While the evidence presented supports the belief

that small computer systems can provide a multifaceted tool, managers must be aware that problems can surface when considering a system for their organizations. These problems fall into four categories: personnel, hardware, software, and costs. People are the heart of the organization and provide the most challenge to the manager in implementing a small computer system, therefore this area will be considered first.

Most people in an organization are familiar with the requirements of their position, are aware of what is expected of them, and are able to accomplish their tasks. Because of this, they are normally content with the status quo. However, with a small computer, their routine is upset. Tasks, procedures, and responsibilities often change. In fact, many will fear for their jobs. At times, this fear translates into counter-productive action or resistance. Therefore the manager should be alert for sabotage efforts towards the computer. Also, managers should be concerned with reduced employee performance, chronic absenteeism, increased tardiness, or worker apathy when a small computer is installed (29:18, 39:26-27, 57:76). There may also be less than supportive reaction from the data processing (DP) staff. Several authors (7:68, 43:157, 48:23) noted that some DP departments see small computers as a threat to their operation and are unwilling to assist the manager contemplating/implementing

a small computer.

The manager himself may also contribute to the problems of bringing a small computer into their area. Because of the immediate availability of small computers, many times support for the system is overlooked. Supplies for initial operation, such as paper, ribbons, or floppy disks, are not purchased with the system, nor is follow-on support established. The proposed site may not be appropriate for the system, because of noise, static control, size, electricity, or communication lines (24:37). Even if the site is prepared, the workers are not always informed of the pending purchase/installation (39:27). This often times further aggravates their fears of the system itself.

Even when the organization is prepared for the small computer, there can be problems with the hardware or software. These problems stem partially from the sheer number of vendors offering products. There are more than 100 manufacturers of computers, most of whom also prepare software packages, and there are hundreds more suppliers of just software (57:68). Kull (42:128) observes that "buyers /are/ overwhelmed by too many choices." This also means that neither hardware nor software is "settled to the extent of having a number of commonly known superior packages," which the manager can recognize (24:37). Even when the number of choices are reduced, the manager is

still faced with other limitations.

In a comprehensive article, Emrick (26:33) states that "most problems associated with implementing minicomputer applications can be expressed by...capacity optimism." Emrick and others (3:23, 24:37, 48:23) are identifying problems which occur because the capacity of the computer is insufficient for the manager's application. When this occurs, other problems may follow, such as the reduction in the speed of data entry/retrieval being degraded to full seconds versus milliseconds.

In addition to underestimating capacity, many times managers fail to anticipate future data processing requirements. Small computers are purchased which cannot communicate with other computers, or only with those from the same manufacturer (1:119). Even after overcoming hardware limitations, the manager may still have a computer which is unusable due to software.

Software is being prepared which, according to Edwards (24:37) is "inferior." The primary problem with software for small computer users is the lack of "user friendly" man/machine interface. Many managers are finding the software too complicated for use by an "inexperienced" user and may have to hire a specialist to operate the machine (48:23). Often, the user is forced to purchase training packages on how to utilize the applications software. An educational consultant notes that "only 20%

[of the software available] is any good [29:22]." Many programs do not check for errors in data submission (36:17), do not provide for security conditions (24:37), or do not recognize an impossible solution to a problem (29:22). The major concern about software which does not accomplish its purpose is the expense of the package. This expense, combined with other unforeseen costs, presents the final set of problems for the manager implementing a small computer.

As with any new piece of equipment, there are future costs which must be recognized by the manager. Some authors suggest that costs incurred to keep the computer operating should be considered in the cost/benefit analysis. First, there are costs of maintaining the system, including preventative measures and unexpected malfunctions. Second, software can be as costly as the computer itself. One author stated that software costs can approach 75% to 100% of hardware costs (24:37), while another suggests that software costs often exceed hardware costs by 20% (57:76). Finally, the costs of changing the work area to accommodate the small computer system should be estimated. Since these costs are not normally programmed for in advance, the manager must determine the impact of these expenses on the operation. In the short run, the small computer purchase may be postponed to reduce the impact.

Summary

Small computer use is rapidly increasing in business organizations. There are two primary reasons for this increase. Small computers enhance the productivity of workers, especially in reducing the time required to accomplish mundane, labor intensive tasks. Additionally, the small computer provides additional data processing (DP) capability. This increased DP capability reduces requests for programs by functional areas and reduces the workload of the mainframe computer. These reductions are possible because of the many uses provided by a small computer.

First, the small computer can be used to decentralize DP to the user's work area. To accomplish this, the small computer may be used as a stand-alone computer system, or networked with other computers. Small computers may be networked with large or small computers. However, when linked with a large computer, the small computer becomes a "front-end processor." In this capacity, the small computer performs some of the tasks normally accomplished by the mainframe computer. Whether a stand-alone system or networked, the small computer can assist management's decision making.

A second small computer use occurs through Decision Support Systems (DSS), where man and machine interact to enhance the capabilities of both. The most popular set of

packages available in DSS allow the manager to ask "what if" questions. Using electronic spread-sheets, with rows and columns containing formulas or data, the manager can test alternative decisions quickly and with greater accuracy than with a small computer. DSS packages also provide quantitative models for statistical analysis and Operations Research type problems. After the small computer assists the decision making process, through office support packages, the small computer can help the manager implement the decision.

The third small computer use category concerned office support. Through word processing, the manager can have letters and other correspondence prepared. Word processing packages will assist in editing, checking errors, and printing the correspondence. Once prepared in final format the small computer system can file documents and distribute them through electronic mail to other small computers. Finally, if the manager desires a discussion on the decision, the small computer allows computer conferences.

A fourth category of small computer use involved the computer's graphics capability. Graphics packages provide three types of charts from data: bar, pie, and x-y line, which may be accomplished in color to enhance their presentation. Small computers also provide for a wide range of visual images. Depending on the software

available, small computers allow these images to be created through commands or various input devices. Also, by combining graphics with word processing, certificates and lecture slides may be created through the small computer.

Finally, small computers may be used to assist instructors through Computer-Based Education. When providing Computer-Assisted Instruction the small computer actually becomes an "instructor" for the student, by providing the subject material, asking the questions, and providing the feedback. In Computer-Managed Instruction, the computer directs the student to the material, tests the student on the material, and directs the student on subsequent actions.

The small computer can be of benefit to many organizations, however, the manager should be aware of problems which can be encountered. Often times employees are afraid of computers and the consequences of their use. Not all hardware and software packages are well developed and may not perform correctly. Finally, small computer purchases often have hidden costs.

Even with their advantages and disadvantages, small computers are a productivity enhancement tool which should be considered by managers. The remainder of this research effort will consider a base level organization, Base Supply, and its use of a small computer. Specifically, I will review tasks which fall into the preceding categories

to determine if a small computer can accomplish supply tasks faster and with greater accuracy.

CHAPTER III

METHODOLOGY

Previous chapters have highlighted the uses of small computers, the types of software which may be used, and the problems involved with using small computers. This chapter describes how this and other information was combined to lend direction to the data collection and data analysis of this research effort. Included in this chapter are introductory remarks on the AFM 67-1 series of regulations, Base Supply responsibilities, task selection criteria, data collection procedures, analysis procedures, and assumptions and limitations recognized.

Introduction

All supply activities must accomplish responsibilities described in AFM 67-1, "USAF SUPPLY MANUAL." This manual is actually a series of directives, broken into Volumes and Parts. Some of these directives cover the responsibilities of all supply activities, while others cover only the responsibilities of automated or manual supply accounts and the tasks associated with their respective responsibilities. Regardless of the location of the Base Supply, these directives establish the same basic responsibilities. These responsibilities are then translated into tasks, which are accomplished using

procedures and information to meet a specific manager's needs or desires. The procedures and information used may not be the same for each supply activity. However, I believe they are similar enough to demonstrate the application of a small computer and its associated software to accomplish the task, without standardizing either the procedures or the information format.

The responsibilities levied on the supply activities by the AFM 67-1 series directives is extensive, ranging from processing customer requests to maintaining statistical data. In addition, other responsibilities may be levied by directives from other functional areas, such as budget or personnel, or by managers within the supply activity. The cumulative effect is to create a very large set of responsibilities.

Task Selection Criteria

This set of responsibilities translates into literally thousands of tasks. A large percentage of these tasks are accomplished by the computer system available; however, there still remain many tasks which must be accomplished manually. Since it would be impossible to study all of the manual tasks in supply activities, I chose a purposive convenience method (25:178) to select the tasks considered in this thesis. The criteria I used to select the tasks are provided below:

(1) To utilize the small computers and software

packages I had available, the task had to be amenable to accomplishment through one or more of these packages.

(2) To meet the desires of supply activity managers, especially those in Strategic Air Command (SAC), tasks were selected from a list prepared by HQ SAC/LGS (49:1), see Appendix A. This list consolidated responses from SAC base-level supply managers to HQ USAF/LEYS message, 281225Z May 1981, "Use of Minicomputers in Supply."

(3) To investigate new task applications, I considered only those task applications not currently being staffed by the Air Force Data Systems Design Center (AFDSDC), or the Air Force Logistics Management Center (AFLMC).

(4) To compliment the BLCIP study (54:37) conducted by the Air Force Comptroller, similar tasks were selected from supply activities.

(5) To clearly visualize the degree of productivity enhancement available from a small computer, two tasks were chosen because they require two manhours or more to accomplish manually.

Data Collection Plan

Manual Task Accomplishment

After the task selection criteria were established, I obtained approval from Major Morrison, Chief of Supply,

2750th Air Base Group, Wright-Patterson Air Force Base (WPAFB), to contact individuals of his supply account on the tasks selected. I utilized the following steps to collect data on how a supply activity manually accomplishes the tasks:

(1) Contact the branch chief responsible for the task, describe the purpose of the research and the type of information required, and be introduced to the individual most skilled at the task.

(2) Establish the AFM 67-1 reference that levies the responsibility and determine what tasks that responsibility translates into for the individual.

(3) Determine when the individual accomplishes the task and how often.

(4) Establish the source of the data/information and record the actual data used to accomplish the task.

(5) Determine the current procedures used to accomplish the task, including what calculations are required, what questions must be asked, and what actions must be accomplished.

(6) Develop an average time to accomplish the task manually, either by actual observation and/or by the individual's estimation.

Computerized Task Accomplishment

After data was collected on how an individual in a supply activity manually accomplishes the tasks, I utilized

the following steps to collect data on how a supply activity could accomplish the same tasks using a small computer and commercially available software:

(1) Determine the software package to use in accomplishing the task.

(2) Read the procedures manual and accomplish examples provided for the software package used.

(3) Develop the specifications necessary to accomplish the same task, using the data obtained from the Wright-Patterson supply activity. I used either a Chromemco System CS-2, a Radio Shack TRS-80 Model III, or both, as well as the software package available for that particular system.

(4) Test the specifications above for logic errors or computational errors.

Data Analysis Plan

Task Accomplishment Comparison

When the tasks had been accomplished using both methods, I utilized the following steps to compare manual versus computerized task accomplishment:

(1) Compare output from both methods, and determine which method, if either, yielded the correct output. Calculate an error rate for both methods.

(2) Compare the time for each method to accomplish the task.

Assumptions and Limitations

In order to accomplish this thesis, it was necessary to make some assumptions. Based on my management experiences at two supply activities, interactions with other supply individuals in four different supply training courses at Lowry AFB, Colorado, and temporary duty assignments at six different supply activities, I believe these assumptions are justified.

First and foremost, I assumed that the responsibilities defined in the AFM 67-1 series of directives were essentially the same for all supply activities. Therefore, the tasks observed at the Wright-Patterson AFB supply activity should be similar enough to other supply activities to demonstrate the application of a small computer and commercial software.

Second, I assumed that individuals in supply activities would be capable of learning how to utilize small computers and commercial software, without being totally data processing literate.

Third, I assumed that those individuals accomplishing tasks at the Wright-Patterson supply activity were knowledgeable of their responsibilities, accomplished the tasks to meet these responsibilities, and provided accurate data.

In addition to these assumptions, I must also note some limitations in the information presented in this

thesis.

First, not all manual tasks could be accomplished more than one time during data collection. Such single observations were necessary, to prevent wasting the productive time of the individuals accomplishing the tasks. Additionally, the academic environment prevented me from being available each time a given task was accomplished.

Second, only one supply activity was contacted to provide data for each task. This was due primarily to time constraints, both on my time and on the other individual's time, as well as on the process required to collect the data for each task.

Third, the selection of tasks to study in the research was purely subjective on my part, and as such may not be represenative of all tasks. There may be many mundane, time-consuming supply tasks which are not amenable to accomplishment using a small computer, no matter what software is available.

Based on the criteria, assumptions, and limitations, I utilized two small computers to accomplish some of the WPAFB supply account's manual tasks and study the results. These results are capsulized in the next chapter.

CHAPTER IV

FINDINGS

This chapter represents a capsulized version of the data collected and analyzed during this research effort. The reader will find specific details of this information in Appendices B through J.

Introduction

In Chapter II, I explored the various uses of a small computer. Through this information I determined that a small computer appeared useful for many of the tasks accomplished at a supply activity. Based on this information and the assumptions and limitations discussed in Chapter III, I began to collect data from the Wright-Patterson AFB Base Supply. I then used this data with the two small computers and available software to study their application. This chapter captures the essence of the research effort, beginning with the productivity enhancements which might be possible from the purchase of a small computer, then a discussion of how small computers were used during the research, and finally, comments on the problems/limitations encountered.

Why Purchase a Small Computer for Base Supply?

Productivity

In selecting tasks to study, one criterion was that two of the tasks should require two or more manhours to accomplish manually. The two tasks which met this criterion were the monthly "How Goes It" briefing computations (Appendix B) and the monthly Customer Liaison call-in analysis (Appendix C).

Based on the data presented in Appendix B, the time savings for the "How Goes It" computations could approach 118 minutes (1 hour, 58 minutes) each month, for a total annual time savings of about 1416 minutes (23 hours, 36 minutes). This time savings must, of course, be tempered by the requirement to learn electronic spread-sheet procedures and create the electronic spread-sheet format, one-time requirements totalling approximately 5.5 hours. Adams (1) indicated that "tedious tasks become very tolerable" when computerized and may lead to increased productivity. The electronic spread-sheet was prepared so that data could be entered directly from the M-32, "Monthly Base Supply Management Report," in page number order. Perhaps the ability to enter the data page by page, relieving the tedious flipping between pages might make the task more tolerable and enhance productivity.

Similar to the "How Goes It" computations, the Customer Liaison call-in analysis may also represent a time

savings. Based on the data presented in Appendix C, the time savings could be about 321 minutes (5 hours, 21 minutes) per month, for a total annual time savings that could approach 3852 minutes (64 hours, 12 minutes). Again, these time savings must be tempered by the requirement to learn the report generation procedures and create the report specifications. Both are one-time requirements totaling approximately 9.5 hours. In this instance, since those accomplishing the analysis do not have to review each work sheet individually, there appears to be a high likelihood of improving productivity. Also, as indicated by Meserve (50), a small computer allows for a greater depth of analysis. With the additional time available and the small computer providing the basic data collection, the analysts may accomplish a more detailed review of specific call-ins.

Beyond these two very labor-intensive tasks, productivity enhancements appear available through the application of office support software packages. For example, through the use of word processing software to accomplish Officer Effectiveness Reports (OER) and welcome letters time might be saved in the administrative areas of Base Supply.

Based on the data presented in Appendix E, it appears that the time savings for each "final" OER prepared is approximately 21 minutes. More importantly, it is the

ability described by Brescia (8), "to adjust documents quickly and easily...without totally retyping the document" which provides the long-run time savings. When corrections or adjustments are made to these "final" reports additional time savings could approximate 20 minutes each time the report is reaccomplished. Assuming that reports are reaccomplished three times, the total savings for the original and the three subsequent reaccomplishments could total 81 minutes (1 hour, 21 minutes). Since each officer has an OER accomplished each year and each account has an average of six officers assigned, word processing of these reports could save 486 minutes (8 hours, 6 minutes) annually. These time savings also must be tempered by the requirement to learn the word processing software, and create the input format. Both are one-time requirements which total approximately 5.3 hours. Another important productivity gain related to a word processing system, is that it releases the clerk-typist to accomplish other duties while the small computer prints the report.

Word processing software was also used to accomplish the preparation of welcome letters for newly assigned individuals. Here, the time savings appear because the clerk-typist only types those pieces of information which change. Based on the data presented in Appendix F, it appears that for each letter prepared the time savings could approximate 4 minutes. Since each newly

assigned individual should receive this letter and most accounts have an average of 35 persons arriving each year, the annual time savings could approximate 140 minutes (2 hours, 20 minutes). This time savings must be adjusted by the time required to learn the word processing package and create the form letter, a total of approximately 5.3 hours. Again, a related gain is that the clerk-typist can accomplish other duties while the small computer prints the letter.

Small Computer Uses

Decentralized Data Processing

Stand-Alone Computers. Because of the configuration of the UNIVAC 1050-IIs currently installed, it is difficult to connect a small computer. Therefore, all of the applications studied utilized the small computer in a stand-alone mode. This meant that most applications required the data to be manually entered into the small computer. However, for some applications, the data was accessed from a file created by another software package and stored on a floppy disk, as when DATAGRAPH accessed files prepared using VISICALC.

Since the Air Force is replacing the UNIVAC 1050-II with a system that will allow an interface with small computer systems, provided they meet specific standards, the small computer will be able to access some

of the data needed to accomplish tasks directly from the UNIVAC 1100 without manual entry. This will allow a small computer network to be created and will permit the small computer to operate as a front-end processor. In addition, the microprocessors being provided with the new UNIVAC 1100s are compatible with a large number of software packages commercially available. This capability will open the doors to applications which can provide the Base Supply manager the type of productivity enhancements previously mentioned.

Decision Support Systems

Electronic Spread-Sheets. The application of electronic spread-sheets to tasks in Base Supply appears to hold great promise. From data gathering and computations for the monthly "How Goes It" briefing, to testing "what if" conditions for the Operations and Maintenance (O&M) budget, these software packages should save managers time, while also improving the accuracy of the computations.

As mentioned earlier, by applying the electronic spread-sheet to the steps required for gathering the data and computing the statistics for the monthly "How Goes It" briefing (Appendix B) time savings could approach 23 hours each year. Although errors occurred infrequently when manually computing the statistics (a total of four errors in six months), no errors occurred when the computer calculated the statistics. Additionally, some M32 data

items are aggregated with others for the "How Goes It" briefing, such as the number of supply account transactions being combined with the equipment, fuels, and munitions account transactions. When the manager wishes to review any single account's transactions in depth, the analyst must again collect the data from each M-32, "Monthly Base Supply Management Report." However, when the task is computerized, all M-32 data items used for the "How Goes It" briefing are input into the spread-sheet individually and may be provided by accessing a single file on a floppy disk.

Another manner of using an electronic spread-sheet aids in the future allocation of the O&M budget among the Base Supply Cost Center Funds Managers, by allowing these "what if" questions to be asked (Appendix H). What if the budget targets remain the same for the remainder of the year, and the expenditures follow the prior year's? What if the budget targets are reduced by 10%, and the expenditures follow the prior year's? What if the budget targets remain the same for the remainder of the year and the expenditures increase by 10% over the prior year's? With each of these situations, calculations are required to answer each of these questions: How much of the budget target will remain at the end of the year? How much of a budget target decrease should occur? How much of a budget target increase should occur?

For the Organization Funds Manager to accomplish the computations for such questions it may take up to 180 minutes (3 hours) each. But through the electronic spread-sheet, the data entry and computations were accomplished in 10 minutes for each different situation. Depending on the necessity for adjustments to the budget, this type of analysis could be accomplished twice each year, once at the six month point, the other at the nine month point. If the analysis was accomplished twice yearly, it would require 1080 minutes (18 hours) manually versus 60 minutes computerized, with possible annual savings equating 1020 minutes (17 hours). These time savings bear out the comments of Bayle (7) and Friedrich (29), on "saving time for managers when recalculating outcomes of alternative decisions or criteria."

Statistical Analysis. The small computer could also assist Base Supply individuals by providing the statistical information needed in accomplishing the monthly Customer Liaison call-in analysis. By reviewing the file of WPAFB Forms 197, "Customer Liaison Worksheets," created for the month, the small computer could provide savings of 321 minutes (5 hours, 21 minutes) each month, thus saving 3852 minutes (64 hours, 12 minutes) annually. In addition to these time savings, the analysis is more consistent over time. By using a computer file, more explicit data may be collected such as the Customer Liaison Office (CLO) Number

for each call-in for each category, without extending the time to complete the analysis. Since the computer uses the call-in status code which was entered into the file each time the report is prepared, there is less subjectivity in the report.

Finally, by using a small computer file, the number of errors appears to reduce, providing a more accurate analysis of the call-ins. A small computer should reduce errors because of the following reasons. First, copies of the work sheets may be printed by the small computer, without having to remove the original from file. Thus reducing the likelihood of work sheets being missing at the time of the analysis. Second, an edit check which prevents duplicate CLO Numbers should reduce errors in computing the number of work sheets prepared. Lastly, by entering the work sheet on the computer, the situation of reading illegible handwriting is alleviated.

Office Support

In addition to the use of small computers to aid in decision making, there also appears to be time savings and error reductions in office support.

Word Processing. As discussed earlier, a word processing package was applied in accomplishing an Officer Effectiveness Report (OER) and a welcome letter. In the instance of the OER, approximately 81 minutes can be saved for preparing the final version. Since 26% of the OERs

submitted to AFIT Personnel Division must be reaccomplished, many hours of productive work time may be realized. Additionally, the number of typing errors which occur (but are corrected) may decrease through the use of a small computer.

By using the form letter preparation portion of the word processing package, 4 minutes was saved for each welcome letter prepared. In addition, the number of typing errors which occurred (but corrected) reduced. Through this type of software, the clerk-typist is not required to spend as much time typing. Since 63% of the time required to produce the letter (5 minutes) is the machine printing the letter, the clerk-typist is provided additional time to accomplish other required tasks.

Records Maintenance. Two tasks were also studied using the ability of the small computer to accept data through screen entry "forms," and then store the forms in an "electronic filing cabinet." The software package was used to place the WPAFB Form 197, "Customer Liaison Worksheet," on the small computer and allow the Customer Liaison to enter the information on the computer, file the form, and prepare an ancillary report from the worksheet file. By accepting information on the computer, the time savings occurred by not having to file the worksheets nor prepare the ancillary report. There were no time savings by entering the information on the computer worksheet

rather than the WPAFB Forms 197. When placing the information onto the form, or entering the information into the computer, a time savings or time loss is only apparent if the individual types well or types poorly. By the computer filing the worksheet and preparing the ancillary report with an average of 131 call-ins per month, the small computer may still save 197 minutes (3 hours, 17 minutes) each month for an annual time savings of 2371 minutes (39 hours, 31 minutes). This time savings should be reduced by the one-time requirements of learning the software procedures and creating the form and the standard report, which require approximately 8 hours.

Although the preceding application of records maintenance indicated an advantage in utilizing a small computer, I attempted this application with another task and found that the software available could not accomplish it. Keypunch cards containing personnel data appeared to be excellent candidates for the application of such records maintenance software, as Ferrarini (27) mentioned, "to add and update records and to print reports, while saving a tremendous amount of time." Such time savings were in fact noted for entering data through the small computer instead of keypunching the cards to correct errors or change pieces of data. Computing the statistics required for the report was also accomplished faster, and with fewer errors. However, when the application was carried to the final

stage, producing a report, the time savings realized were not enough to compensate for the lack of a usable report. Although the computer would correctly sort by the first parameter, the information within that parameter was incorrectly sequenced as the computer always placed the last item updated at the end of the list, rather than the original required sequence.

Graphics

Data Presentation. The ability to translate data into graphics, as indicated in Chapter II, "allows much more information to be displayed in a coherent manner [18]." This is a subjective statement, based on the manager's needs and desires, and therefore no measure of time used or error could be assessed. However, it is important to the thesis to consider the small computer's capability in this regard.

By utilizing data available at the supply activity studied, I was able to create graphical presentations which were not prepared previously, or which were too difficult to prepare by hand such as bar charts showing different periods of time and pie charts (Appendix I). These graphs were prepared primarily through the use of data which was drawn from electronic spread-sheets or from calculations accomplished by electronic spread-sheets. Although the Chromemco small computer has a color graphics capability, the graphics printer was not functioning, and I was limited

to using the Radio Shack small computer.

Based on the Industrial Management & Data Systems (41) article which states, "The display of graphics can consolidate data from multiple sources and focus attention on significant facts and figures," it appears that graphics presentations could enhance the analyses accomplished for the "How Goes It" briefing slides and the Customer Liaison Worksheets. By preparing pie charts, the manager can see the percentages of call-ins monthly by type. Using the same information, x-y line charts can be prepared faster than by hand for the three-month period being considered. Also, if the manager wished to see the information using a longer period, the x-y line chart can be prepared faster when computerized than it could be manually. I recognize that these are subjective observations, but nonetheless, I feel they are appropriate to the research objective of thisthesis.

Training

Computer-Assisted Instruction. Through the use of the Author I software package, I utilized the small computer to present portions of the supply activities equipment custodian training package (Appendix J). No data could be collected to determine whether a computerized CAI course was faster or more accurate than one accomplished manually. However, based on the article by Orlansky and String (53), there is reason to believe that training can

be accomplished at least equally as well by a small computer. Additionally, there are some subjective observations about having a small computer assist the trainer. First, the trainer need not be available for an individual to be trained. If there is a single individual who needs training, the small computer could be used. Second, because of the word processing capability, and the resultant possibility of less resistance to updating information, the course content may remain more current. Finally, since the computer can be used to proctor the test, the trainer can accomplish other duties.

Computer-Managed Instruction. The same software package was used to create a CMI capability. Again, I used the equipment custodian training package (Appendix J). However, I see little likelihood of improved performance. The largest benefits, appear to be the ability to conduct training when the trainer is not available and to provide test proctoring.

Small Computer Limitations/Problems

During this thesis effort, I experienced to some degree all of the limitations/problems described in Chapter II. Additionally, I experienced many of the "small computer buff's axioms," namely, "always make a back-up copy of everything," "there's never enough memory," "commercial software provides an 80% solution," and "you never have enough floppy disks."

Surprisingly there were very few personnel problems discovered during the thesis effort. All of the individuals contacted at the supply activity were interested in the outcomes of the applications and were positively motivated towards a small computer being used in accomplishing parts of their tasks. It must be noted that the UNIVAC 1050-II has been a part of their activities for many years, so the resistance to a computer is minimized.

As addressed by many of the authors highlighted in Chapter II, an individual can be fooled by "capacity optimism." Both computers used had 64K of randomly accessible memory (RAM) which I believed would more than adequately handle all applications which I would attempt. However, in the first use of CalcStar (Appendix B), I surpassed the capacity of the memory to hold both the CalcStar software and the matrix which I wanted to load, supporting axiom two that "there's never enough memory." The matrix was to be two columns of 196 entries, two columns of 40 entries, and two columns of 50 entries, while the CalcStar capability is 58 columns of 254 entries. However, because of the size of the descriptors being used to facilitate data entry, the RAM capacity was exceeded at two columns of 196 entries. In addition, the problem was not recognized until after I had stored the 2 by 196 matrix on a file and attempted to load the matrix back into CalcStar. At this time, the system would not allow the

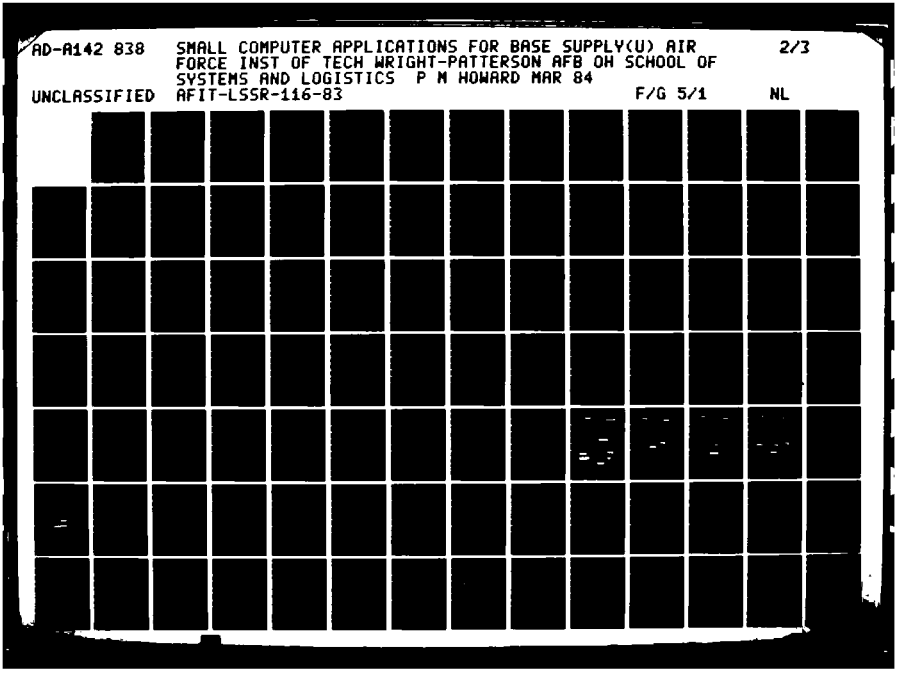
matrix back into RAM and the effort turned out to be useless without a computer having larger capacity.

In addition, the Chromemco at AFIT has been plagued with a recurring problem of becoming inoperative and losing all system and user files. While I was working on the system, such an event occurred and lent credence to axiom one, "always make a back-up copy of everything."

Not all the problems I encountered were hardware related. Many related to the software and the documentation provided by the manufacturer. For example, I found that all of the software documentation provided for the "Star" product (CalcStar, ReportStar, DataStar, and WordStar) were somewhat difficult to understand. Indeed the documentation for DATAGRAPH was most difficult of all. However, the documentation for VISICALC was easy to comprehend, as it was for SCRIPSIT and SuperSCRIPSIT.

Furthermore, the cursor control for the "Star" products is quite difficult, as the user must keep one finger on the "Control" key and use another finger to press the key to move the cursor. In addition, the cursor does not "repeat," thus the user must press these two keys for each incremental movement of the cursor.

For the applications reviewed in this thesis, axiom three, "commercial software provides an 80% solution," also seemed to be borne out. This was due primarily to my inability to create either the report for the personnel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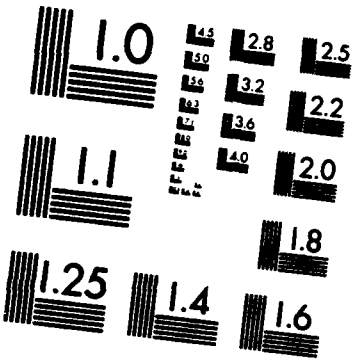

monitor (Appendix G) or the all-encompassing data entry electronic spread-sheet for the management analyst (Appendix B). This was extremely disheartening, especially when considering the cost of the software. Beyond the hardware, software is the largest added expense in utilizing a small computer. The software used on the Chromemco for this thesis lists commercially for $1885, while the software used on the Radio Shack lists commercially at $850, almost half the current list prices for the computers themselves.

There are also costs associated with the items required to support small computer use: floppy disks, paper, printing ribbons, and other items. In the case of floppy disks, the software manufacturer recommends that a copy be made to support everyday use and that the original be stored away. Data file disks also proliferate, as there always seems to be a reason to maintain a copy of the file "as it was." All of these conditions support axiom four, "you never have enough floppy disks."

All of these items lead to an increase in the cost of operating the organization which must be balanced against productivity enhancements and increased accuracy. The last chapter will present conclusions from this research effort and recommendations for future efforts.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The small computer has been introduced into many organizations, large and small, computerized and non-computerized, with generally excellent results. Productivity enhancements have been observed, as have improved data processing capabilities. Small computers have been utilized in a wide range of applications, demonstrating their versatility and proving that they are a multifaceted tool for the manager. The Air Force has recently recognized the small computer's capabilities and has taken some positive steps in utilizing the small computer. However, these steps have not yet placed the small computer in large numbers at the base level manager's disposal, nor has there been widely distributed research on small computer utilization at base level organizations. This research was a study of some Base Supply responsibilities and their associated tasks to determine if these tasks could be accomplished faster and more accurately using a small computer.

Conclusions

As with any effort, often times the "anticipated" results have no relationships to the outcomes. I found

this statement truthful several times while collecting the data, developing the application packages, and analyzing the results. However, considering the responsibilities and tasks studied in this research in light of the given assumptions and limitations, it appears that a small computer can accomplish some of the tasks of a base level supply activity faster and more accurately. However, I also found that some tasks could not be accomplished totally by using a small computer. Additionally, there were some problems encountered in using the small computer. Thus, as with any management tool, the small computer is not a panacea.

The selection of tasks was purely subjective. However, through these tasks, the research covered a wide range of small computer uses. By considering the "How Goes It" briefing preparation, a statistical electronic spread-sheet was reviewed (Appendix B). By considering the "Customer Liaison Worksheet" filing, a data entry form was reviewed, records maintenance capability was addressed, and report generation was studied (Appendices C and D). By considering the preparation of an OER, normal word processing was reviewed (Appendix E). By considering the preparation of welcome letters, form letter word processing was reviewed (Appendix F). By considering the personnel report creation, another type of data entry, records maintenance, and report generation was reviewed

(Appendix G). By considering future budget allocation, a decision support electronic spread-sheet was reviewed (Appendix H). By considering analysis data from the "How Goes It" briefing and the "Customer Liaison Worksheet" analysis, graphics capability was reviewed (Appendix I). And finally, by considering the equipment custodian training, Computer-Based Education was reviewed (Appendix J).

By accumulating the time saved and time lost for the limited set of tasks studied, there is a possibility of annually gaining at least 6165 minutes (102 hours, 45 minutes) at this supply activity (Table 1). In addition to these time savings, there appear to be additional time saving possibilities which could not be determined in this research as in graphics preparation and training accomplishment.

With only these tasks being computerized, the dollar savings would equate to at least $1,137.89 for this supply activity based on the pay grade of an E-4. However, this assumes that each task is being accomplished by different individuals, thus requiring each individual to learn the entire software package. However, after a small computer system is installed, I believe that more tasks would be computerized, with savings similar to those found in this research.

TABLE 1

Time Savings Computations

Method	Time, Minutes Annually						
	1	2	3	4	5	6	7
Manual	1812	4320	2491	840	420	0	1080
Computer	396	468	120	354	280	0	60
Learning	600	270	360	300	300	360	300
Formatting	30	300	120	20	10	120	30
Savings	786	3282	1891	166	-170	-480	690

Task 1: "How Goes It" Briefing Statistics
Task 2: "Customer Liaison Worksheet" Analysis
Task 3: "Customer Liaison Worksheet" Filing
Task 4: Officer Effectiveness Report Preparation
Task 5: Welcome Letter Preparation
Task 6: Personnel Report Preparation
Task 7: Budget Allocation Changes

Recommendations

Because the scope of this research was very confined due to time, manpower, and money, additional studies should be accomplished on other tasks within supply activities. This research could be assisted by collecting data at Plattsburg AFB, NY, which has utilized a small computer in their Management and Analysis Section for several years.

An ongoing study, distributed Air Force wide should be established to review commercially available software packages and provide managers with an evaluation of the software. This study could also be the basis for determining a set of standard software packages which could be procured in bulk quantities. This would lessen the

requirement of training people on each software package used by the different base organizations. Training on the various applications of these standard software packages could be accomplished at the Technical Training Center at Lowry, as a supply technician received training on other aspects of the supply operations.

A set of guidelines for standard features to be included in each small computer purchased by Air Force organizations should be established. My research on this subject indicates there are many recommendations but no "firm" set of guidelines or standards exists.

Dissemination of information on small computers should be given a higher priority. There are many excellent pieces of literature prepared by numerous offices within the Air Force, but the base level audience appears to be ignorant of its existence. Possibly the recently created Small Computer/Office Automation Service Organization will fill this void as it becomes more firmly planted in its role.

Finally, because of the productivity enhancements offered by small computers, the time is correct for purchases of small computers by base level supply activities. These small computers offer the ability to interconnect with the UNIVAC 1100, which allow them to augment the mainframe. In addition, because of their stand-alone capability, they can be a beneficial tool for

managers for many years.

APPENDIX A

SAC PROPOSALS FOR USE OF MINI-COMPUTERS IN SUPPLY

SAC PROPOSALS FOR USE OF MINI-COMPUTERS IN SUPPLY

(NOTE: This is a direct quotation of Attachment 1, HQ SAC/LGS Letter, Subject: Use of Mini-computers in Supply, to HQ USAF/LEYS, 9 July 1981 (49)).

MANAGEMENT ANALYSIS SECTION.

A mini-computer would allow this section to maintain historical data indefinitely in memory of disk/tape storage. Such storage would be more readily retrievable and less burdensome to record and store than on present manually prepared worksheets or UNIVAC prepared listings. A linked printer module could produce hard copy data as required to forward to other offices/higher headquarters.

A computer would expand the capability of the section to perform real analysis and projections into logistics areas, rather than just compile data. Time savings to produce more and better analyses would be considerable.

Under Phase IV, a wire hookup with the main frame computer could load selected data directly into the analysis mini-computers in the analysis sections of different base supplies and higher headquarters can now be linked telephonically to transfer requested data without the need to mail listing or send messages.

Proposed subject computers be used to store account statistical data to perform instant trend analysis of areas where unfavorable performance is suspected.

Use to assist in tracking of "How goes it" data for the chief of supply's monthly review. Storage and retrieval capability would provide for an accurate and timely review of performance indicators.

"How goes it" statistics.

Could be used in plotting trends and comparative data in the Analysis Section.

Further, utilization of the mini-computer as a statistician and slide maker would streamline the supply analysis functions. Additionally, one who is not a mathematician would need only be required to interpret data in lieu of being able to compute.

A computer system which can correlate, print, and trend/chart data received through management reports such

as M24 and M32.

How goes it. Will provide the chief of supply with the capability to immediately identify deficient areas.

Key Management Indicators (KMI). Provide the chief of supply with a ready reference to compare statistical data against other Air Force bases.

Delivery time study. Provides management analysis current figures on average deliver times for priority issues.

Branch effectiveness report. Provides management analysis with current figures on manning.

FUNDS MANAGEMENT SECTION.

A mini-computer with add on printer in funds could be used to develop stock fund targets and annual budget programs much more quickly and accurately because all relevant data would be internally stored. Daily or as required updates for HHQ could be made on the spot. The volume of external files could be reduced from nearly four file cabinets to a desk drawer because all needed data would be stored in memory or disk/tape storage. Such frustrating operations as developing and updating the 3080 investment fund budget and justification could be readily accomplished if the data were computerized.

Trend data analysis. Provide the funds manager with current figures on the stock fund operation.

Compile information from schedules 1, 2, & 4 of general support operating program. Provide funds a means to compute information from schedules 1, 2, & 4 of the general support operating program and compare to schedule 5. Approved general support operating program.

Funds management: This could be used by personnel to interrogate the organization, record area and MACR. This would really be ideal at End-of-Year Close Out. Mini-computers could be used by Research, Retail Sales and Customer Liaison office to run inquiries. If these machines have a screen capacity, it would be a tremendous saving of DD Forms 1348-1, and to check location balances in Post-Post. It could also enable each area to perform individual input without the increased workload on keypunch and machine operators.

Could be used to record data and develop stock fund operating programs and track budget information.

TRAINING SECTION.

Training Schedules. Will provide the Training Section with a ready reference concerning required training, dates, quotas, and personnel that require training.

GMT Records.

A mini-computer could be effectively utilized within the training section to accumulate and maintain data required for the quarterly submission of RCS: SAC-LGS(Q)8006, training effectiveness report. At the present time, this data is accumulated manually and requires the expenditure of approximately 10 manhours each time the report is submitted. A mini-computer would be of immeasurable value as this data could be easily accumulated each time a military member in and out processes through the Training Section.

A training mini-computer could also be effectively used in the OJT program to record training data, schedule upcoming CDC and WAPS tests, etc. A linked printer module would allow a hard copy training record, if necessary, such as when an individual goes PCS or on a mobility assignment. Mini-computer capability would be similar to the B3500 MMICS system, only better, because supply would be more adaptable to our own squadron needs. If necessary and desirable, a telephone hookup with B3500 could be made, if programming language were similar.

Mechanically record AFR 50-10 training attendance. Although maintenance (66-1) units record attendance in MMICS, supply is expected to also retain attendance records. Eliminate external files of attendance.

Record ancillary training required by AFR 50-1, ancillary training is now recorded on AF Form 991. Training schedules and attendance records could be mechanically recorded.

Allow the capability to maintain personnel status by position numbers, the current training status (ancillary, CDC).

Maintain ancillary training, small arms training, evaluations, schedules, course exam, schedule CDC volume tests, 50-24 training, chemical training.

Maintain other training requirements for the squadron. This would enable the supply training section to have immediate access to above training data without referring to manual lists. This should save approximately 30 percent of the time required to compile data from external listings

when providing data to customers. A computer printout listing all training data for an individual could be much nicer and quicker than providing the individual with several copies of training data.

FUELS MANAGEMENT BRANCH.

Action is being taken to obtain a mini-computer for use in the fuels branch. Intentions are to load gauging charts for all tanks and use the computer to convert measurements to gallons. All training/appointment requirements will be input. Product will go to each supervisor. Qualifications will be input with program to update. Mobility team members and equipment will be input. Fuels sampling and inspections will be loaded. Manning, projected loss & gains, reporting officials, scheduled leaves, and equipment status will be programmed. Additional uses of the computer are expected as our experience level increases.

Maintain all vehicle status, i.e., in or out of commission.

VDP, VDM, EWO limits.

Maintain all the training status of personnel to insure they are qualified or due for evaluation of a particular task.

Maintain meter readings on vehicles to perform analysis when large variances occur during an issue. This would be especially useful when the accountant is not on duty when the discrepancy occurs.

Consolidation of the CMAL for the various types of aircraft and governments authorized to be serviced by the fuels branch.

In the fuels area the mini-computer could be employed to monitor the Base Energy Conservation Program and fuel sample test data on equipment and facilities (hydrants, tanks). Further we could include maintenance of personnel training status and individuals requiring periodic task evaluation. Incorporate monitoring of the fuels branch's work orders with civil engineers.

Organization ground fuel consumption data.

MICAP MANAGEMENT SECTION.

Computer system programmed through a link by phone lines or satellite, which can automatically extract balances on S/B's which have MICAP's from any base where it is loaded, provide instantaneous status from depots and can talk through use of CRT with IM managers.

Store data presently maintained on SAC Form 259 and MICAP status boards. Data could be loaded by requisition number and weapon systems indicator and retrieved in like manner.

A mini-computer and printer in MICAP with a remote and printer in maintenance material control/MSL would considerably enhance direct aircraft supply support. Maintenance data and supply status could be loaded for stock number on aircraft tail number, stored in memory and updated as changes occur. Since both MSL and MICAP would have immediate access to status and more data than at present the requirement to "Run the Boards" with each other would be ended. Present manual management products and files, such as the D-23 and SAC Form 259 cards could be eliminated since all computer memory data could be dumped to disk/tape file. If hard copy information is required it could be printed as required.

A program to analyze all MICAP parts requests by cause code and start-stop time could be developed and bumped against the stored MICAP data to project anticipated time of next incident for that NSN and recommend stockage level changes to prevent it. The master SNUD could also be loaded on the mini-computer which would considerably speed up lateral support checks.

MICAP Analysis/Trends.

DOCUMENT CONTROL SECTION.

A mini-computer with large memory, or the capacity for add on disk/tape memory unit, could be used to record all transaction data necessary for research of future document retrieval, output only display terminals in inventory, stock control, receiving, retail sales, et al, could be linked by wire or telephone to permit computer transaction research and display of relevant data without having to sign out the actual documents themselves. A printer capability for inventory would eliminate having to write out M-10 transaction listings, a time consuming task.

The time savings of this computer system would be considerable, particularly if a method of non-manual input of data could be devised. With the UNIVAC 1050-II, perhaps a punchcard output with each document that could be used to load the information in the mini-computer. Under Phase IV a wire hookup between the main frame computer and the mini could fulfill this functions automatically. Document storage would be a simple on time event, because with the required information computerized, the constant need to screen the document files (largely dictated be inspection requirements) could be eliminated. Manpower slots could be

cut in document control as a result of full implementation of this system.

ADMINISTRATION SECTION

Capability to maintain publications and forms, utilize for crossfeed comparisons, and analysis.

Additionally, local manning listing, detail roster, and training requirements could also be automated.

A mini-computer could be used as a central repository for miscellaneous checklists, inventories of office supplies, storage of appointment calendar data. Most importantly, a mini-computer could store every Air Force manual anyone in base supply could ever need. The appropriate data could be displayed on a cathode ray terminal (CRT) hooked into the mini-computer. Should a hard copy of the data be needed, a printing device could be tied in to print it out. The overall savings in paper and storage binders should be enormous.

Manning listing. Will provide current information on assigned supply personnel such as duty location, skill level, authorized vs on hand.

Additional duties listing & schedules, provide the commander with current duty roster on what personnel are assigned to monitor additional duties. For example, safety officer, self-inspection monitor, vehicle control officer, etc.

Recurring suspense schedules, provide administrative information to effectively monitor weekly, monthly or quarterly recurring suspenses.

ORDERLY ROOM/ADMINISTRATION.

A mini-computer with add on printer would give the capability to record and retrieve personnel data for ancillary training, squadron and base details, projected appointments, leaves, APRs/OERs, awards, security clearances, immunization data, et al. The printer would allow producing hard copies when required for administrative purposes.

A separate word processing printer could be added to this mini-computer to allow quicker, more professional, typing of repetitive correspondence that is now so time consuming, such correspondence includes, awards and decorations, newcomer's letters, notification letters for appointments, mobility processing, details, etc. The administrative time savings alone may result in reduction of one personnel

position.

To insure maximum computer utilization, this mini-computer could be time shared with the LGSPT, training section.

Could be used in squadron admin to track forms requirements, publications and suspense files.

Administrative correspondence: A computer system to input control and recall correspondence. This system could be used by management to monitor the progress of correspondence requiring action/reply and be workers to print replies through CRT, which can then be typed by automatic typewriters.

Personnel management. Used to manage and control training/details/appointments, etc. to insure timely completions.

Capability to maintain personnel status by position numbers, the current training status (ancillary, CDC).

STOCK CONTROL SECTION.

Exception Code Data.

A mini-computer with printer could be used to store name and phone number of item managers for each stock class and depot to accelerate follow up actions. All exception data could be loaded which would eliminate manual exception card files.

Current information on RODS, JBB/JBD, etc., items would be easier to maintain.

Store data maintained for exception code card decks eliminating the card decks and providing rapid retrieval of information.

Potential elimination of other manually maintained data decks exist as application is broadened.

PROCEDURES AND STANDARDIZATION SECTION.

P&S Surveillance Checklist. Allow for accurate expeditious updating. Provide management with an easily accessible Management Information System (MIS).

ROF Reporting. Provide current data on all organization identification codes, FAD codes, and other reporting organization file data for those activities assigned.

Personnel Management.

ALLOWANCE AND AUTHORIZATION SECTION.

Consolidated Table of Allowance file.

AF Form 538 file.

Equipment custodian file.

It might also be worthwhile to load up the T.A. on equipment items.

ADPE/PCAM OPERATION SECTION.

Provide a test bank for development of supply assembly language (SAL) utility programs 008 at base level. Selected records from the main computer (e.g., item, detail, repair cycle, etc.) would be uploaded to the mini-computer--about 100 to 500 of each kind, as well as the current ACNS of 008, 007, 010, and 232. SAL Programs could be tested, perfected and modified on the mini-computer, leaving the main computer for pure processing, thus saving material and computer time.

The mini-computer could be tied into an alternate site computer, in case of the failure of one base's main computer.

It could be used much as current RJET and DCT 2000 systems are, having necessary peripherals like a card reader, printer, and card punch hooked into the mini-computer. The records of one base's downed main computer could be transmitted to the alternate, and processing done through the mini-computer. This could be a cost-saving alternative to a base with a downed computer sending a team TDY to an alternative site.

A mini-computer could be used as an environmental and security monitor. Heating and air conditioning could be under program control, monitored by sensors throughout the supply building. Smoke/fire/poison gas monitors could be tied into a mini-computer, which would sound alarms and inform the fire department of emergencies in progress. Security alarms could monitor break-in attempts, and notify base security police in similar fashion. In case of danger from lightening, tornadoes, earthquakes and the like, a computer could sound alarms and kill power faster than humanly possible.

ADPE utilization/downtime analysis.

Recurring AF Form 2011 file/monthly computer schedule.

Supply operations: A system of utilizing data output from the main computer to separate outstanding workload from routine listings, i.e., A management listing for the stock control officer to identify specifically only what work is outstanding such as priority due-outs without AFC actions, memo due-outs with TEX "7" and without, memo due-outs with REX "1" assigned, list of all item records with REX "1", potential problem items with priority due-outs and bad status, priority due-ins with follow-up codes below 96, etc. This management tool could be used to monitor workload and insure timely completion.

Use for maintaining daily and monthly computer schedules, code edits, ship destination records, computer distribution schedules, microfiche media (combination IL/ML/CRL) except on code cards, and weapon control files.

RECORDS MAINTENANCE SECTION.

AF Form 86 file.

Recommend loading of the stock list by part number and FIN to produce automated cross referencing, thus speeding research and reducing human error.

SPECIAL ASSET MANAGEMENT SECTION.

Mobility listing. Will be able to identify personnel assigned to mobility teams and provide the squadron mobility officer & NCO with an information file for personnel assigned to those teams. For example, eligibility, immunizations required, high threat area training date, etc.

WRSK Critical/Essential Items. Provide current information identifying those items designated as critical or essential to the WRSK in order to support mobility tasking.

WRSK/MSK Deployments: Mini-computers could possibly be used to record data during a deployment. This could replace the use of AF Form 2009-1 (Manual Acounting Form).

BENCH STOCK SUPPORT UNIT.

Bench Stock: Mini-computers could be used by Bench Stock to inventory and submit replenishment issues. This would save recording form requirement and keypunching 1BS cards.

DEMAND PROCESSING UNIT.

Demand Processing: Mini-computers could be used while taking routine issue requirements. Requests could be recorded on mini-computers and input later either through

the remote or mainline. This would save hand scribing AF Form 2005, keypunching, etc.

INVENTORY SECTION.

Inventory: Cycle inventory locations could be transferred to mini-computers. Records could be displayed by location.

MATERIAL STORAGE AND DISTRIBUTION BRANCH.

Reusable containers could be accounted for on the mini-computer. The TPO number and quantity could be entered and eliminate the present confusion and time wasted to "hunt" for a container.

Compressed gas cylinders. An interrogation method could be implemented to provide an immediate reference for those cylinders becoming due hydrostatic testing for a given period. Availability of such information would provide accurate budget information and enhance the overall management of government-owned cylinders.

Scheme-CEM Equipment Management. A data base could be established for each scheme number to reflect the number of pieces received, transportation control number, date received, date issued, and date completed. The data base would remain available until the annual inventory is completed before deleting completed scheme number. An automated system would also provide a ready reference for an on hand scheme.

TCTO Number to NSN Cross Reference Data File. Establish a cross reference table for all affected stock numbers at the time of initial screening. The data base would remain on file until the item records are deleted or until the recission date of the TCTO is applicable.

RETAIL SALES SECTION.

Based upon associated software that comes with the mini-computer, the possibilities of placing the retail outlets in a realtime mode would be fantastic. If programming could be effected that would allow input of a line number and quantity that would print a listing by stock number the customer could sign and a card output that could be used to update the 1050-II. It would also be a time saver.

APPENDIX B

MONTHLY "HOW GOES IT" BRIEFING CALCULATIONS

MONTHLY "HOW GOES IT BRIEFING" CALCULATIONS

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 10d(1)(a).

Responsibility: Obtain and analyze statistical data to determine the effectiveness of the account.

Office of Primary Responsibility (OPR): Management Analysis Section.

Software: CalcStar.
VISICALC.

Hardware: Chromemco, System CS-2.
Radio Shack, TRS-80 Model III.

Manual Task Accomplishment Steps:

(1) Management analyst receives direction from the Chief of Supply and/or Management and Procedures Officer on the information to be presented at the monthly Supply "How Goes It" briefing and determines source of information to be presented.

(2) Management analyst receives M-32, "Monthly Base Supply Management Report, Parts 1, 2, and 3;" gathers 112 items of data each month from 13 pages (Figures 1-13); and accomplishes 114 computations for the slides presented at the "How Goes It" briefing. Time used: 150 minutes, average per month, based on 6 months of data gathering and statistics computations (Table 2).

Computer Task Accomplishment Steps:

(1) Management analyst receives direction from the Chief of Supply and/or Management and Procedures Officer on the information to be presented at the monthly Supply "How Goes It" briefing and determines source of information to be presented.

(2) Management analyst learns the procedures for the electronic spread-sheet software package. Time used: a one time requirement of 5 hours, for CalcStar or VISICALC.

(3) Management analyst creates the electronic spread-sheet (Figure 14). Time Used: a one time requirement of .5 hours, for CalcStar or VISICALC.

(4) Management analyst receives M-32, "Monthly Base Supply Management Report, Parts 1, 2, and 3;" and enters 112 items of data each month from 13 pages (Figures 1-13) into electronic spread-sheet. Time used: 28 minutes, average time for inputing data per month, based on 6 months of data entry.

(5) Management analyst directs computer to provide the necessary 114 computations. Time used: 5 minutes, average computation time per month, based on 6 months of data entry.

Analysis:

(1) Speed:

(a) Manual accomplishment of data gathering and statistics computing was observed only once and the actual time was 158 minutes (2 hours, 38 minutes). The management analyst estimates that 150 minutes (2 hours, 30 minutes) is the average time for task accomplishment (Table 2).

(b) Computer assisted data gathering was observed six times and the average time used was 28 minutes. Computerized accomplishment of statistics computing was observed six times and the average time used was six minutes (Table 2).

(c) Based on the data presented, it appears that the tasks associated with developing the "How Goes It" briefing can be accomplished faster when computerized than they can manually.

(2) Accuracy:

(a) Manual accuracy for statistics computation was observed for six months of data, and the average number of errors per month was .66 (Table 3).

(b) Computerized accuracy for statistics computation was observed for six months of data, and the average number of errors per month was zero (Table 3).

(c) Based on the data presented, it appears that the number of errors will be less using the computerized method.

TABLE 2

Data Gathering And Statistics Computation

Method	Time Used, Minutes Per Month					
	Jan	Feb	Mar	Apr	May	Jun
Manually Both	150*	150*	150*	150*	150*	158
Computerized						
Data Gathering	30	28	29	27	29	26
Statistics	5	6	5	5	5	6

* Management analyst's estimation of time used.

TABLE 3

Errors In Computations

Method	Errors, Number Per Month					
	Jan	Feb	Mar	Apr	May	Jun
Manually	1	2	0	0	1	0
Computerized	0	0	0	0	0	0

Subjective Observations:

(1) Manual Accomplishment:

(a) The Management analyst wastes considerable time trying to locate data from the M-32. To gather data from the listing, the analyst must continually flip pages backwards and forwards, extracting different data from the same page as many as five times.

(2) Computerized Accomplishment:

(a) The electronic spread-sheet design (Figure 14) allows data entry by the management analyst in M-32 page number order. This alleviates the need to flip pages backwards and forwards and allows all data to be extracted from a given page at the same time. In addition, since the spread-sheet software allows calculations from any input location, the calculation results required for the "How Goes It" briefing slides are provided in slide presentation sequence (Figure 14).

(b) When using CalcStar with the Chromemco small computer, I ran out of storage room in the randomly accessible memory (RAM) while trying to prepare an all-encompassing data entry screen. This data entry screen would have relieved the analyst from gathering some of the same M-32 data for another of his responsibilities. After inputing and storing the required data base, the computer would not allow the stored spread-sheet back into RAM. Therefore, this endeavor was not feasible using the Chromemco System CS-2 and CalcStar without increasing RAM capability.

MONTHLY BASE SUPPLY MANAGEMENT REPORT (PART 1 (M32/888- 01 DATE PAGE 1

MISCELLANEOUS TRANSACTION SUMMARY

CATEGORY	TOTAL	PERCENT	CATEGORY	TOTAL	PERCENT
[illegible] TRANS D ACCT (CSB)	709	56	A&F TRANS D ACCT (CSB)	42	35
[illegible] TRANS D ACCT (SAT)	44	3	A&F TRANS D ACCT (SAT)	0	0
[illegible] TRANS E ACCT (CSB)	159	12	A&F TRANS E ACCT (CSB)	19	15
[illegible] TRANS E ACCT (SAT)	43	3	A&F TRANS E ACCT (SAT)	20	16
[illegible] TRANS K ACCT (CSB)	79	6	A&F TRANS K ACCT (CSB)	0	0
[illegible] TRANS K ACCT (SAT)	46	3	A&F TRANS K ACCT (SAT)	0	0
[illegible] TRANS P ACCT (CSB)	174	13	A&F TRANS P ACCT (CSB)	39	32
[illegible] TRANS P ACCT (SAT)	9	0	A&F TRANS P ACCT (SAT)	0	0
TOTAL M&R TRANSACTIONS	1263		TOTAL A&F TRANSACTIONS	120	

SATELLITE TRANSACTION SUMMARY

CATEGORY	TOTAL	PERCENT	CATEGORY	TOTAL	PERCENT
[illegible] TRANS K ACCT (A1)	20	43	NMR TRANS P ACCT (A1)	9	100
[illegible] TRANS K ACCT (A2)	17	36	NMR TRANS P ACCT (A2)	0	0
[illegible] TRANS K ACCT (A3)	0	0	NMR TRANS P ACCT (A3)	0	0
[illegible] TRANS K ACCT (A4)	0	0	NMR TRANS P ACCT (A4)	0	0
[illegible] TRANS K ACCT (A5)	0	0	NMR TRANS P ACCT (A5)	0	0
[illegible] TRANS K ACCT (A6)	3	6	NMR TRANS P ACCT (A6)	0	0
[illegible] TRANS K ACCT (A7)	0	0	NMR TRANS P ACCT (A7)	0	0
[illegible] TRANS K ACCT (A8)	5	10	NMR TRANS P ACCT (A8)	0	0
[illegible] TRANS K ACCT (A9)	1	2	NMR TRANS P ACCT (A9)	0	0
TOTAL M&R TRANSACTIONS	46		TOTAL NMR TRANSACTIONS	9	

RECEIVING FREQUENCY

[illegible] TIMES COMPLETED 00

[illegible] OF LAST [illegible]

FOLLOW-UP FREQUENCY

FOR TIMES COMPLETED 00

DATE OF LAST COMPLETION MMMM

FIGURE 1.

Sample M32; PART 1, Page 1

MONTHLY BASE SUPPLY MANAGEMENT REPORT PART 1 (M32-808-) 01 DATE PAGE 2

COMPUTER UTILIZATION DATA

	PRIMARY SYSTEM			SECONDARY SYSTEM		
	SET-UP/TEAR DOWN	TIME USED	%	SET-UP/TEAR DOWN	TIME USED	%
TRANSACTION PROCESSING	:55	200:03	29	:00	:00	0
END OF DAY REPORTS	:07	100:24	28	:00	:00	0
UTILITY PROGRAMS	:10	129:39	19	:00	:00	0
MAJOR COMMAND PROGRAMS	:00	:00	0	:00	:00	0
MISCELLANEOUS PROGRAMS	:00	:04	0	:00	:00	0
LOANED TIME	:00	:00	0	:00	:00	0
CHARGEABLE RERUN	:00	:00	0	:00	:00	0
NON-CHARGEABLE RERUN	:00	:00	0	:00	:00	0
PREP/DEV/MAINT	:00	:00	0	:00	:00	0
MODIFICATION/DEMO	:00	:00	0	:00	:00	0
REMEDIAL MAINTENANCE	:00	:00	0	:00	:00	0
PREVENTIVE MAINTENANCE	:00	36:00	5	:00	:00	0
IDLE TIME	:00	:00	0	:00	:00	0
OFF TIME	:00	109:34	16	:00	:00	0
ENVIRONMENTAL FAILURE	:00	7:04	1	:00	:00	0
NON-SUPPLY PROCESSING	:00	:00	0	:00	:00	0
TOTAL	1:12	670:48		:00	:00	

FIGURE 2.

Sample M32; PART 1, Page 2

MONTHLY BASE SUPPLY MANAGEMENT REPORT PART 1 (M32/8##-) A1 42## PAGE 3

FILE PACK DATA

TYPE OF RECORD	NUMBER OF SECTORS	NUMBER OF RECORDS	NUMBER OF LANDLORDS	NUMBER OF TENANT SEC	NUMBER OF BLANK SEC	NUMBER OF FULL SEC	PERCENTAGE OF FILE PACK
DATE TOTALS STORED		#24 -		#29 -	#46 -		
BASIC RECORDS							
ITEM RECORDS	4#96	2871	1684	1187	1225	2871	71
REPAIR CYCLE RECORDS	4#96	721	482	239	3375	721	18
DETAIL RECORDS							
BASIC DETAIL RECORDS	4#96	4733	2426	831	839	1476	8#
IN-USE DETAILS	4#96	#22	568	98	3438	156	17
SUPPORT RECORDS							
CUM REJ ERROR SUSP	#96	#	#	#	#96	#	#
ITCH & SUB GRP	8448	72	63	9	8376	72	1
INVENTORY ADJ RCDS	2#48	178	#	#	1878	178	9
MACR RECORDS	128	35	6	#	93	35	2#
ORG COST CENTER RCDS	4#3#	307	#	#	2772	122#	31
PROJ FUND MGMT RCDS	496	88	#	#	32#	176	36
ROUTING IDENT RCDS	64#	136	#	#	368	272	43
SHIPPING DEST RCDS	32#	77	#	#	243	77	25
STK FUND INV MGT RCD	2176	183	#	#	1978	286	1#
FUELS INV ADJUST RCD	576	#	#	#	576	#	#
PART NUMBER RCD							1##

AVAILABLE TRACKS FOR SORT/TR AREA 9

FIGURE 3.

Sample M32; PART 1, Page 3

MONTHLY BASE SUPPLY MANAGEMENT REPORT PART 2 (M32/BBB-) PAGE 2

CUSTOMER SUPPORT EFFECTIVENESS

CIVIL ENGINEER ORGS

URGENCY OF NEED	LINE ITEMS REQUESTED	LINE ITEMS ISSUED	LINE ITEMS BACK ORDERED	ISSUE EFFECTIVENESS	LINE ITEMS B/O 4W	STOCKAGE EFFECTIVENESS	DOR ON TIME	TOTAL DOR	RELEASE EFFECTIVENESS
GENERAL SUPPORT DIVISION									
A	0	0	0	.00%	0	.00%	1	1	100.00%
B	0	0	0	.00%	0	.00%	0	0	.00%
C	23	32	0	100.00%	0	100.00%	0	0	.00%
TOTAL	23	32	0	100.00%	0	100.00%	1	1	100.00%
SYSTEM SUPPORT DIVISION									
A	1	1	0	100.00%	0	100.00%	0	0	.00%
B	2	2	0	100.00%	0	100.00%	0	0	.00%
C	0	1	0	100.00%	0	100.00%	0	0	.00%
TOTAL	3	4	0	100.00%	0	100.00%	0	0	.00%
CENTRAL LEVEL ANALYSIS									
A	0	0	0	.00%	0	.00%	0	0	.00%
B	0	0	0	.00%	0	.00%	0	0	.00%
C	0	0	0	.00%	0	.00%	0	0	.00%
TOTAL	0	0	0	.00%	0	.00%	0	0	.00%
NON-CENTRAL LEVEL ANAL									
A	2	1	11	8.33%	11	100.00%	0	0	.00%
B	1	0	1	.00%	0	.00%	0	0	.00%
C	1	1	1	50.00%	0	50.00%	0	0	.00%
TOTAL	4	2	13	13.33%	11	50.00%	0	0	.00%
OVERALL TOTAL									
A	3	2	11	15.38%	11	100.00%	1	1	100.00%
B	3	2	1	66.66%	0	66.66%	0	0	.00%
C	24	34	1	97.14%	0	97.14%	0	0	.00%
TOTAL	30	38	13	74.50%	11	95.00%	1	1	100.00%
ERRC SUMMARY									
RECOVERABLE	2	1	1	50.00%	0	50.00%	0	0	.00%
EOQ	28	37	12	75.51%	11	97.36%	1	1	100.00%
TOTAL	30	38	13	74.50%	11	95.00%	1	1	100.00%
EQUIPMENT	1	2	0	100.00%	0	100.00%	0	1	.00%

FIGURE 4.

Sample M32; PART 2, Page 2

DAILY BASE SUPPLY MANAGEMENT REPORT PART 2 (M32/B08-2A) PAGE 5

CUSTOMER SUPPORT EFFECTIVENESS

OVERALL SUMMARY

URGENCY OF NEED	LINE ITEMS REQUESTED	LINE ITEMS ISSUED	LINE ITEMS BACK ORDERED	ISSUE EFFECTIVENESS	LINE ITEMS B/O 4W	STOCKAGE EFFECTIVENESS	DOR ON TIME	TOTAL DOR	RELEASE EFFECTIVENESS
GENERAL SUPPORT DIVISION									
A	1	1	0	100.00%	0	100.00%	0	0	.00%
B	1	0	0	.00%	0	.00%	0	0	.00%
C	32	29	4	87.87%	1	90.62%	0	0	.00%
TOTAL	34	30	4	88.23%	1	90.90%	0	0	.00%
SYSTEM SUPPORT DIVISION									
A	0	0	0	.00%	0	.00%	0	0	.00%
B	0	0	0	.00%	0	.00%	0	0	.00%
C	0	0	0	.00%	0	.00%	0	0	.00%
TOTAL	0	0	0	.00%	0	.00%	0	0	.00%
CENTRAL LEVEL ANALYSIS									
A	0	0	0	.00%	0	.00%	0	1	.00%
B	0	0	0	.00%	0	.00%	0	0	.00%
C	0	0	0	.00%	0	.00%	0	0	.00%
TOTAL	0	0	0	.00%	0	.00%	0	1	.00%
NON-CENTRAL LEVEL ANAL									
A	1	0	3	.00%	0	.00%	0	0	.00%
B	0	0	0	.00%	0	.00%	0	0	.00%
C	1	0	1	.00%	1	.00%	0	0	.00%
TOTAL	2	0	4	.00%	1	.00%	0	0	.00%
OVERALL TOTAL									
A	2	1	3	25.00%	0	25.00%	0	1	.00%
B	1	0	0	.00%	0	.00%	0	0	.00%
C	33	29	5	85.29%	2	90.62%	0	0	.00%
TOTAL	36	30	8	78.94%	2	83.33%	0	1	.00%
ERRC SUMMARY									
RECOVERABLE	1	0	1	.00%	1	.00%	0	1	.00%
LOG	35	30	7	81.08%	1	83.33%	0	0	.00%
TOTAL	36	30	8	79.04%	2	83.33%	0	1	.00%
EQUIPMENT	11	1	11	8.33%	2	10.00%	1	2	50.00%

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FIGURE 5.

Sample M32; PART 2, Page 5

DPDO TRANSFER STRATIFICATION

REASON CODE	GSD L/I	GSD DOLLAR VALUE	SSU L/I	SSU DOLLAR VALUE	INVESTIBCS L/I	INVESTIBCS DOLLAR VALUE	NON-STOCK FUND L/I	NON-STOCK FUND DOLLAR VALUE	TOTAL L/I	TOTAL DOLLAR VALUE
SUPPLIES DIRECTED										
A	155	$2,500	100	$6,000	10	$20,000	50	$45,050	315	$73,550
P/7	29	$1,010	11	$510	3	$4,010	55	$1,400	98	$6,930
SUBTOTAL	184	$3,510	111	$6,510	13	$24,010	105	$46,450	413	$80,480
UNSER(MEMO)	92	$2,000	1	$10	30	$50	21	$10	144	$2,070
NON-DIRECTED										
F	1	$230	1	$4,060	45	$1,100	82	$1,001	129	$6,391
N	3	$50	8	$40	11	$85	31	$110	53	$285
K	7	$8,020	155	$2,500	100	$6,000	10	$20,000	272	$36,520
OTHER	50	$45,050	29	$1,010	11	$510	3	$4,010	93	$50,580
SUBTOTAL	61	$53,350	193	$7,610	167	$7,695	126	$25,121	547	$93,776
UNSER(MEMO)	55	$1,400	92	$2,000	1	$10	30	$50	178	$3,460
TOTAL-B/E	245	$56,060	304	$14,120	180	$31,705	231	$71,571	960	$174,256
EQUIPMENT DIRECTED										
A	21	$10	1	$230	1	$4,060	45	$1,100	68	$5,400
P/7	82	$1,001	3	$50	8	$40	11	$85	104	$1,176
SUBTOTAL	103	$1,011	4	$280	9	$4,100	56	$1,185	172	$6,570
UNSER(MEMO)	31	$110	7	$8,020	155	$2,500	100	$6,000	293	$16,630
NON-DIRECTED										
F	10	$20,000	50	$45,050	29	$1,010	11	$510	100	$66,570
N	3	$4,010	55	$1,400	92	$2,000	1	$10	151	$7,420
K	30	$50	21	$10	1	$230	1	$4,060	53	$4,350
OTHER	45	$1,100	82	$1,001	3	$50	8	$40	138	$2,291
SUBTOTAL	88	$25,160	208	$47,461	125	$3,290	21	$4,620	442	$80,531
UNSER(MEMO)	11	$85	31	$110	7	$8,020	155	$2,500	204	$10,715
TOTAL-B/E	191	$26,171	212	$47,741	134	$7,390	77	$5,005	614	$87,187
OVERALL DIRECTED										
A	176	$2,510	101	$6,230	11	$24,060	95	$46,150	383	$78,950
P/7	111	$2,011	14	$560	11	$4,050	66	$1,405	202	$8,106
SUBTOTAL	287	$4,521	115	$6,790	22	$28,110	161	$47,635	585	$87,056
UNSER(MEMO)	123	$2,110	8	$8,030	185	$2,550	121	$6,010	437	$18,700
NON-DIRECTED										
F	11	$20,230	51	$49,110	74	$2,110	93	$1,511	229	$72,961
N	6	$4,060	63	$1,440	103	$2,005	32	$120	204	$7,705
K	37	$8,070	176	$2,510	101	$6,230	11	$24,060	325	$40,870
OTHER	95	$46,150	111	$2,011	14	$560	11	$4,050	231	$52,771
SUBTOTAL	149	$78,510	401	$55,071	292	$10,905	147	$29,741	989	$174,307
UNSER(MEMO)	66	$1,405	123	$2,110	8	$8,030	185	$2,550	382	$14,175
TOTAL-B/E	436	$83,031	516	$61,861	314	$39,095	308	$77,376	1574	$261,363

FIGURE 6.

Sample M32; PART 2, Page 9

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REQUISITION SUMMARY - SUPPLIES

CATEGORY	PRI GRP I	DOLLAR VALUE	PRI GRP II	DOLLAR VALUE	PRI GRP III	DOLLAR VALUE	TOTAL	DOLLAR VALUE
AFLC SSD								
SPR SPEC RQMT	0	0	0	0	0	0	0	0
SPR OFF LINE	0	0	2	$500	0	0	2	$500
SPR IN LINE	0	0	0	0	2	$500	2	$500
REQUISITIONS	0	0	0	0	0	0	0	0
TOTAL	0	0	2	$500	2	$500	4	$1,000
AFLC NSF								
SPR SPEC RQMT	0	0	0	0	0	0	0	0
SPR OFF LINE	0	0	0	0	2	$48	2	$48
SPR IN LINE	0	0	0	0	0	0	0	0
REQUISITIONS	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	2	$48	2	$48
LP								
SPR SPEC RQMT	2	$500	0	0	0	0	2	$500
SPR OFF LINE	0	0	2	$284	2	$2	4	$286
SPR IN LINE	0	0	0	0	0	0	0	0
REQUISITIONS	0	0	0	0	0	0	0	0
TOTAL	2	$500	2	$284	2	$2	6	$786
DSA								
SPR SPEC RQMT	0	0	0	0	0	0	0	0
SPR OFF LINE	0	0	0	0	0	0	0	0
SPR IN LINE	0	0	0	0	0	0	0	0
REQUISITIONS	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0
DLA								
SPR SPEC RQMT	0	0	0	0	0	0	0	0
SPR OFF LINE	0	0	0	0	0	0	0	0
SPR IN LINE	0	0	0	0	0	0	0	0
REQUISITIONS	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0
OTHER								
SPR SPEC RQMT	0	0	0	0	0	0	0	0
SPR OFF LINE	0	0	0	0	0	0	0	0
SPR IN LINE	0	0	0	0	0	0	0	0
REQUISITIONS	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0
OVERALL								
SPR SPEC RQMT	2	$500	0	0	0	0	2	$500
SPR OFF LINE	0	0	4	$784	4	$50	8	$754
SPR IN LINE	0	0	0	0	2	$500	2	$500
REQUISITIONS	0	0	0	0	0	0	0	0
TOTAL	2	$500	4	$784	6	$550	12	$1,754

PPMR BASE TO BASE

	PRI GP 1	PCT	PRI GP 2	PCT	PRI GP 3	PCT	TOTAL
PPMR BASE - BASE	0	0	2	100	0	0	2

FIGURE 7.

Sample M32; PART 2, Page 10

MONTHLY BASE SUPPLY MANAGEMENT REPORT PART 2 (M32/RUN- 1) P1 DATE PAGE 14

TRANSACTION SUMMARY

TYPE TRANSACTION	SUPPLIES	EQUIPMENT	TOTAL	TYPE TRANSACTION	SUPPLIES	EQUIPMENT	TOTAL
ISSUES RECURRING	105	6	111	ASSET INQUIRY	0	0	0
ISSUES NON-RECURRING	4	1	5	TRN TRANS	0	0	0
ISSUES INITIAL	0	1	1	WHSE LOC ADD	0	0	0
ISSUES POST-POST	1	0	1	WHSE LOC CHG	0	0	0
*TOTAL ISSUES	109	8	117	RDO	0	1	1
DUE-OUT RECURRING	54	5	59	RDO DENIALS	0	0	0
DUE-OUT NONRECURRING	4	1	5	WASH POST TRANX	0	0	0
DUE-OUT INITIAL	3	5	8	REVERSE POST TRANX	2	0	2
DUE-OUT NOT AUTH STK	52	4	56	SSC PROCESSED	0	0	0
*TOTAL DUE-OUTS	61	11	72	DCC CARDS PRODUCED	207	58	265
TURN-INS SERVICEABLE	76	10	86	XD1 TRANSACTIONS	5	0	5
TURN-INS UNSERV	31	2	33	XD2 TRANSACTIONS	169	0	169
TURN-INS FOB	0	0	0	XD3 TRANSACTIONS	30	0	30
*TOTAL TURN-INS	107	12	119	XF3 TRANSACTIONS	42	0	42
ISSUES TO WRSK	1	0	1	XB3 TRANSACTIONS	328	1	329
DOR TO WRSK	0	0	0	ND TRANSACTIONS	0	42	42
ISSUES FROM WRSK	1	0	1	NF TRANSACTIONS	12	89	101
TURN-INS FROM WRSK	3	0	3	EXPEDITE ISSUES	7	0	7
*TOTAL WRSK TRANX	5	0	5	EXPEDITE KILLS	4	0	4
L/I SHIPMENTS SERV	2	3	5	EXPEDITE DUO	49	0	49
L/I SHIPMENTS UNSERV	0	0	0	EXPEDITE DOR	15	0	15
*TOTAL SHIPMENTS	2	3	5	EXPEDITE TIN	41	0	41
RECEIPTS NOT DUE-IN	1	0	1	ROUTINE ISSUES	80	5	85
RECEIPTS UNSERV	0	0	0	ROUTINE KILLS	0	0	0
RECEIPTS LP	0	0	0	ROUTINE DUO	7	0	7
RECEIPTS JLS	0	0	0	ROUTINE DOR	2	0	2
RECEIPTS OTHER	0	0	0	ROUTINE TIN	29	0	29
*TOTAL RECEIPTS	0	0	0	BENCH STOCK ISSUES	18	0	18
FILE CHANGES SNUD	0	1	1	BENCH STOCK KILLS	0	0	0
FILE CHANGES OTHER	10	0	10	BENCH STOCK DUO	2	0	2
*TOTAL FILE CHANGES	10	1	11	BENCH STOCK DOR	0	0	0
INV ADJ(TRANS)	0	0	0	BENCH STOCK TIN	4	0	4
INV ADJ(WHS REFUSAL)	0	0	0	EAID ISSUES	0	2	2
INV ADJ (FOB)	0	0	0	EAID KILLS	0	0	0
INV ADJ(OTHER)	2	0	2	EAID DUO	0	6	6
*TOTAL INV ADJ	2	0	2	EAID DOR	0	0	0
COND CHG SERV-UNSERV	0	0	0	EAID TIN	1	2	3
COND CHG UNSERV-SERV	1	2	3	NON-EAID ISSUES	0	1	1
*TOTAL COND CHG	1	2	3	NON-EAID KILLS	0	0	0
ITEM RCD ADD	0	0	0	NON-EAID DUO	1	5	6
ITEM RCD DELETE	4	0	4	NON-EAID DOR	0	0	0
*TOTAL ITEM RCD	4	0	4	NON-EAID TIN	2	2	4
IDENTITY CHANGES-FCH	2	0	2	MISC TRANSACTIONS	367	113	480
BSS TRANS	0	1	1	TOTAL TRANS(THIS SD)	709	159	868

FIGURE 8.

Sample M32; PART 2, Page 14

DATE TOTALS STORED — MONTHLY BASE SUPPLY MANAGEMENT REPORT PART 2 (M32/888-/ /) 81 — DATE — PAGE 20

STATUS OF DUE-INS

	AFLC		DLA		GSA		LP		OTHER		TOTAL	
	TOTAL	PCT	TOTAL	PCT	TOTAL	PCT	TOTAL	PCT	TOTAL	PCT	TOTAL	PCT
PRI GP 1												
1-15 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
16-30 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
31-45 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
46-60 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
61-90 DAYS	26	20	0	0	0	0	0	0	0	0	26	16
OVER 90 DAYS	130	79	15	100	2	100	9	100	5	100	151	83
TOTAL	156	28	15	22	2	8	9	14	5	15	157	24
PRI GP 2												
1-12 DAYS	3	1	0	0	0	0	0	0	0	0	3	1
13-25 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
26-40 DAYS	43	25	0	0	0	0	2	13	0	0	45	28
41-60 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
OVER 60 DAYS	123	72	17	100	18	100	13	96	6	100	177	78
TOTAL	169	37	17	25	18	78	15	24	6	18	225	35
PRI GP 3												
1-30 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
31-75 DAYS	54	35	5	14	0	0	0	0	0	0	59	23
76-90 DAYS	0	0	0	0	0	0	0	0	0	0	0	0
91-180 DAYS	3	1	4	11	0	0	3	8	1	4	11	4
181-OVER	97	62	26	74	3	100	34	91	21	95	181	72
TOTAL	154	34	35	52	3	13	37	60	22	66	251	39
OVERALL TOTAL	449		67		23		61		33		633	

PPMR DATA

	GRP 1	PCT	GRP 2	PCT	GRP 3	PCT	TOTAL	PCT
OTHER 1-30 DAYS	0	0	0	0	0	0	0	0
OTHER OVER 30 DAYS	3	0	34	0	1	0	34	0
TOTAL	3		34		1		34	

FIGURE 9.

Sample M32; PART 2, Page 20

DATE TOTALS STORED 0249

ITEM RECORD DATA

TYPE ITEM DATA	SUPPLIES	EQUIPMENT	TOTAL	PCT	TYPE ITEM DATA	SUPPLIES	EQUIPMENT	TOTAL	PCT
ERRCD XD1	62	0	62	3	ERRCD XD2	190	0	190	10
ERRCD XD3	109	0	109	6	ERRCD XF3	156	0	156	8
ERRCD XB3	923	0	923	52	ERRCD ND	0	146	146	8
ERRCD NF	1	180	181	10	*TOTAL ITM RCDS	1445	326	1771	100
WASH POST	3	0	3	0	TCTO KIT	10	0	10	0
PART NUMBERS	32	0	32	1	LOCALLY ASGND	10	2	12	0
NC/ND	11	0	11	6	*TOTAL NON-NSN	67	10	77	4
EEX 1 NON-IM RPT	12	0	12	6	EEX 2 CMD DIST	1	0	1	0
EEX 3 RPT TO CMD	8	0	8	0	EEX 4 SEASONAL	4	0	4	0
EEX 5 ATTRITION	5	0	5	0	EEX 6 SPEC PROC	2	0	2	0
EEX 7 USAF DIR	1	0	1	0	EEX 8 UNUSED	0	0	0	0
EEX 9 UNUSED	0	0	0	0	EEX ALPHA	9	0	9	0
*TOTAL EEX	42	0	42	2	EMC 1	0	80	80	4
EMC 2	0	16	16	0	EMC 3	0	88	88	4
EMC 4	0	123	123	6	EMC 5	0	19	19	1
IEX ALPHA	9	2	11	0	IEX NUMERIC	88	8	96	5
*TOTAL IEX	97	10	107	6	REX ALPHA	122	5	127	7
REX 0 SAT PROC	1	0	1	0	REX 1 DO NOT RQN	4	24	28	1
REX 2 LP/LM	9	0	9	0	REX 3 DO NOT RQN	1	1	2	0
REX 4 DO NOT RQN	0	2	2	0	REX 5 ADU REMARK	2	1	3	0
REX 6 AFUSDC USE	3	0	3	0	REX 7 ANNUAL RQN	1	0	1	0
REX 8 TRADE-IN	5	0	5	0	REX 9 SP COM VEH	0	2	2	0
*TOTAL REX	140	35	183	10	SEX ALPHA	24	12	36	2
SEX NUMERIC	32	9	41	2	*TOTAL SEX	56	21	77	4
FROZEN INVENTORY	8	0	8	0	FROZEN OTHER	3	0	3	0
*TOTAL FROZEN	11	0	11	0	PAST DUE INV-365	1185	275	1460	82
INTENSIVE MGMT	1	0	1	0	CRITICAL	40	0	40	2
SOS AFLC	789	152	941	53	SOS GSA	85	40	125	7
SOS DLA	243	42	285	16	SOS BP	163	42	205	11
SOS OTHER	165	50	215	12	BUDGET CODE Y	19	5	24	1
LOCAL ASGND ERRC	22	0	22	1	I/R W/C FACTOR>1	0	0	0	0
NON-CENTRAL ANAL	330	0	330	18	I/R W/WHSE LOC	1310	295	1605	90
CENTRAL LVL ANAL	0	0	0	0	PAST DUE INV-180	1	8	9	0
SPC 1	12	0	12	0	SPC 2	50	0	50	2
SPC 3	45	0	45	2	SPC 4	414	0	414	23
SPC 5	284	0	284	16	SPC A	1	0	1	0
SPC B	1	0	1	0	SPC C	0	0	0	0
SPC D	0	0	0	0	SPC E	0	0	0	0
FSTQ CURRENT	11	1	12	0	FSTQ NUMERIC	0	0	0	0
FSTQ OTHER	1445	326	1771	100	SERV BAL NO LOC	60	18	78	4
NR I/R K ACCOUNT	280	0	280		NR I/R P ACCOUNT	30	0	30	

FIGURE 10.

Sample M32; PART 2, Page 25

BENCH STOCK SUMMARY

CATEGORY	L/I AUTH	L/T DUE OUT	DUE OUT <15/30 DAYS	DELAYED D/O	D/O RATE	DELAY RATE
MAINTENANCE ORGNS						
ON BASE	2	0	0	0	0%	0%
OFF BASE	30	0	0	0	0%	0%
TOTAL	32	0	0	0	0%	0%
CE ORGANIZATIONS						
ON BASE	0	0	0	0	0%	0%
OFF BASE	0	0	0	0	0%	0%
TOTAL	0	0	0	0	0%	0%
VEHICLE ORGANIZATIONS						
ON BASE	0	0	0	0	0%	0%
OFF BASE	0	0	0	0	0%	0%
TOTAL	0	0	0	0	0%	0%
OTHER ORGANIZATIONS						
ON BASE	32	0	0	0	0%	0%
OFF BASE	0	0	0	0	0%	0%
TOTAL	32	0	0	0	0%	0%
OVERALL SUMMARY						
ON BASE	34	0	0	0	0%	0%
OFF BASE	30	0	0	0	0%	0%
TOTAL	64	0	0	0	0%	0%

FIGURE 11.

Sample M32; PART 2, Page 26

DATE TO/ALS STORED

SOURCE OF SUPPLY SUMMARY

CATEGORY	AFLC	DLA	GSA	LP	OTHER	TOTAL
RECEIPTS SUMMARY						
PRI GP 1						
REC W/STD DAYS	60	28	40	52	32	212
REC W/175% STD	184	84	120	156	96	636
AVG DAYS	5	5	5	5	5	
REC > 175% STD	975	455	650	845	520	3445
REC EXCLUDED(%)	80	80	80	80	80	80
REC ON TIME(%)	20	20	20	20	20	20
PRI GP 2						
REC W/STD DAYS	90	42	64	78	48	318
REC W/175% STD	360	168	240	312	192	1272
AVG DAYS	7	7	7	7	7	
REC > 175% STD	1200	560	800	1040	640	4240
REC EXCLUDED(%)	72	72	72	72	72	72
REC ON TIME(%)	28	28	28	28	28	28
PRI GP 3						
REC W/STD DAYS	1380	644	920	1196	736	4876
REC W/175% STD	570	266	380	494	304	2014
AVG DAYS	1	1	1	1	1	
REC > 175% STD	675	315	450	585	360	2385
REC EXCLUDED(%)	25	25	25	25	25	25
REC ON TIME(%)	75	75	75	75	75	75
AIRLIFT INVESTMENT						
REC W/STD DAYS	750	350	500	650	400	2650
REC W/175% STD	0	0	0	0	0	0
AVG DAYS	1	1	1	1	1	
REC > 175% STD	0	0	0	0	0	0
REC EXCLUDED(%)	0	0	0	0	0	0
REC ON TIME(%)	100	100	100	100	100	100
TOTAL						
REC W/STD DAYS	2280	1064	1520	1976	1216	8056
REC W/175% STD	1114	518	740	962	592	3922
AVG DAYS	1	1	1	1	1	
REC > 175% STD	2850	1330	1900	2470	1520	10070
REC EXCLUDED(%)	45	45	45	45	45	45
REC ON TIME(%)	55	55	55	55	55	55
STATUS SUMMARY						
PRI GP 1						
ON TIME	75	71% 35	71% 50	71% 65	71% 40	71% 265 71%
DELAYED	30	14	20	26	16	106
TOTAL	105	49	70	91	56	371
PRI GP 2						
ON TIME	153	71% 78	71% 100	71% 130	71% 80	71% 530 71%
DELAYED	68	28	40	52	32	212
TOTAL	218	98	140	182	112	742
PRI GP 3						
ON TIME	225	71% 105	71% 150	71% 195	71% 120	71% 795 71%
DELAYED	90	42	60	78	48	318
TOTAL	315	147	210	273	168	1113
TOTAL						
ON TIME	453	71% 218	71% 310	71% 390	71% 240	71% 1590 71%
DELAYED	180	84	120	156	96	636
TOTAL	630	294	420	546	336	2226

FIGURE 12.

DATE TOTALS STORED

SOURCE OF SUPPLY SUMMARY

CATEGORY	AFLC	DLA	GSA	LP	OTHER	TOTAL
RECEIPTS SUMMARY						
PRI GP 1						
REC W/STD DAYS	60	28	42	52	32	212
REC W/175% STD	184	84	128	156	96	636
AVG DAYS	5	5	5	5	5	
REC > 175% STD	975	455	656	845	520	3445
REC EXCLUDED(%)	80	80	80	80	80	80
REC ON TIME(%)	20	20	20	20	20	20
PRI GP 2						
REC W/STD DAYS	90	42	64	78	48	318
REC W/175% STD	360	168	248	312	192	1272
AVG DAYS	7	7	7	7	7	
REC > 175% STD	1200	560	800	1040	640	4240
REC EXCLUDED(%)	72	72	72	72	72	72
REC ON TIME(%)	28	28	28	28	28	28
PRI GP 3						
REC W/STD DAYS	1380	644	920	1196	736	4876
REC W/175% STD	570	266	380	494	304	2014
AVG DAYS	1	1	1	1	1	
REC > 175% STD	675	315	450	585	360	2385
REC EXCLUDED(%)	25	25	25	25	25	25
REC ON TIME(%)	75	75	75	75	75	75
AIRLIFT INVESTMENT						
REC W/STD DAYS	750	350	500	650	400	2650
REC W/175% STD	0	0	0	0	0	0
AVG DAYS	1	1	1	1	1	
REC > 175% STD	1	0	0	0	0	0
REC EXCLUDED(%)	0	0	0	0	0	0
REC ON TIME(%)	100	100	100	100	100	100
TOTAL						
REC W/STD DAYS	2280	1064	1524	1976	1216	8056
REC W/175% STD	1114	518	748	962	592	3922
AVG DAYS	1	1	1	1	1	
REC > 175% STD	2850	1330	1904	2470	1520	10070
REC EXCLUDED(%)	45	45	45	45	45	45
REC ON TIME(%)	55	55	55	55	55	55
STATUS SUMMARY						
PRI GP 1						
ON TIME	75 71%	35 71%	50 71%	65 71%	40 71%	265 71%
DELAYED	30	14	20	26	16	106
TOTAL	105	49	70	91	56	371
PRI GP 2						
ON TIME	150 71%	70 71%	100 71%	130 71%	80 71%	530 71%
DELAYED	60	28	40	52	32	212
TOTAL	210	98	140	182	112	742
PRI GP 3						
ON TIME	225 71%	105 71%	150 71%	195 71%	120 71%	795 71%
DELAYED	90	42	60	78	48	318
TOTAL	315	147	210	273	168	1113
TOTAL						
ON TIME	450 71%	210 71%	300 71%	390 71%	240 71%	1590 71%
DELAYED	180	84	120	156	96	636
TOTAL	630	294	420	546	336	2226

FIGURE 12.

MONTHLY BASE SUPPLY MANAGEMENT REPORT PART 2 (M32/800) 01 DATE PAGE 31

INVENTORY ACCURACY STRATIFICATION

	LINE ITEMS COUNTED	LINE ITEMS OVER	LINE ITEMS SHORT	RECORD BALANCE	$ VALUE RECORDED BALANCE	TOTAL UNITS OVER	$ VALUE OVERAGES	TOTAL UNITS SHORT	$ VALUE SHORTAGES	ACCY %
COMPLETE										
REPAIR CYCLE	100	5	2	1000	$9,499	15	$850	3	$300	90
EOQ	1500	70	90	2850	$3,850	115	$210	130	$270	92
EQUIPMENT	85	15	12	120	$6,295	20	$495	12	$360	74
TOTAL	1685	90	104	3970	$19,644	150	$1,555	145	$930	93
SPECIAL										
REPAIR CYCLE	50	10	10	200	$669	10	$186	10	$186	90
DIFM	50	10	10	150	$7,500	10	$500	10	$500	87
EOQ	20	10	10	169	$469	10	$40	10	$40	80
EQ/WHSE	50	10	10	200	$639	10	$186	10	$186	90
IN-USE	50	10	10	150	$7,500	10	$500	10	$500	87
TOTAL	220	50	50	869	$17,177	50	$1,412	50	$1,412	80
IDENTITY CHANGE										
REPAIR CYCLE	52	12	12	202	$871	12	$188	12	$188	
EOQ	52	12	12	157	$7,560	12	$510	12	$550	
EQUIPMENT	22	12	12	171	$471	12	$42	12	$42	
TOTAL	126	36	36	530	$8,902	36	$740	36	$780	

	TOTAL ITEMS IN LOT	TOTAL ITEMS SAMPLED	NBR ERRORS SIG.	NBR ERRORS INSIG.	TOTAL RECORD BALANCE	$ VALUE RECORDED BALANCE	ACCY %	LOTS PASSED	LOTS FAILED
SAMPLE									
REPAIR CYCLE	500	50	20	15	100	$4,000	30		
EOQ	555	55	1	3	1000	$9,000	93		
EQUIPMENT	300	30	0	1	300	$3,000	97		
TOTAL	1355	135	21	19	1400	$16,000	71	0	1

FIGURE 13.

Sample M32; PART 2, Page 31

ITEM	ENTRY	SLIDE	CALCULATIONS
M32, PART 1	29 JULY 83		
Page 1			
NBR TRANS B ACCT (CSB)		SSA1	
NBR TRANS E ACCT (CSB)			
NBR TRANS K ACCT (CSB)		SSA2	
NBR TRANS P ACCT (CSB)			
RELEVELING NBR COMPLETED			
FOLLOW-UP FREQ COMPLETED		SSA4	
Page 2			
TRANSACTION PROCESSING		SSI4	
LOANED TIME			
LOANED TIME SECONDARY			
PREVENTATIVE MAINTENANCE		SSI6	
OFF TIME			
OFF TIME SECONDARY			
TOTAL PRIMARY			
TOTAL SECONDARY		SSI7	
Page 3			
ITEM RECORDS		SMS1	
ORG COST CENTER RECDS			
PART 2, Page 2			
LINE ITEMS ISSUED, TOTAL		SMS2	
LINE ITEMS BACK ORDERED			
LINE ITEMS B/O 4W, TOTAL			
Page 5			
LINE ITEMS REQUESTED		SMS3	
LINE ITEMS ISSUED, TOTAL			
LINE ITEMS BACK ORDERED			
LINE ITEMS B/O 4W, TOTAL		SMS4	
TOTAL DOR TOTAL			
TOTAL DOR EQUIPMENT			
Page 8			
RTS (INCL AWP) (MEMO)			
NRTS (INCL AWP) (MEMO)		SMS5	
COND (INCL AWP) (MEMO)			
TOTAL UNITS:RTS			
TOTAL UNITS:NRTS			
TOTAL UNITS:COND		SMS6	

FIGURE 14.

M32 Input Screen Format

Page 9	
L/I TOTAL, TOTAL-B/E	SMS7
Page 10	
PRI GRP I TOTAL	
PRI GRP II TOTAL	SMS7A
PRI GRP III TOTAL	
SPR SPEC RQMT	
SPR OFF LINE	
SPR IN LINE	
REQUISITIONS	
Page 11	
MICAP CAUSE TOTAL	SMS8
Page 14	
*TOTAL ISSUES	
*TOTAL TURN-INS	
L/I SHIPMENTS UNSERV	
*TOTAL SHIPMENTS	SMS8A
RECEIPTS NOT DUE-IN	
RECEIPTS LP	
RECEIPTS JLS	
RECEIPTS OTHER	
*TOTAL RECEIPTS	
INV ADJ (WHS REFUSAL)	
TRN TRANS	
RDO	SMS9
REVERSE POST TRANX	
EXPEDITE ISSUES	
EXPEDITE KILLS	
EXPEDITE DUO	
ROUTINE ISSUES	SMS9A
ROUTINE KILLS	
ROUTINE DUO	
BENCH STOCK ISSUES	
BENCH STOCK DUO	
BENCH STOCK DOR	
NON-EAID ISSUES	
NON-EAID KILLS	
TOTAL TRANS (THIS SD)	
Page 15	
IEU NBR LINE ITEMS	
GENL RETAIL NBR LINE ITEM	SMS10A

FIGURE 14 (Continued).

Page 20
AFLC PRI GP 1 1-8 DAYS
DLA PRI GP 1 1-8 DAYS
GSA PRI GP 1 1-8 DAYS
LP PRI GP 1 1-8 DAYS
AFLC TOTAL PRI GP 1
DLA TOTAL PRI GP 1
GSA TOTAL PRI GP 1
LP TOTAL PRI GP 1 SMS11
AFLC PRI GP 2 1-12 DAYS
DLA PRI GP 2 1-12 DAYS
GSA PRI GP 2 1-12 DAYS
LP PRI GP 2 1-12 DAYS SMS12
AFLC TOTAL PRI GP 2
DLA TOTAL PRI GP 2
GSA TOTAL PRI GP 2
LP TOTAL PRI GP 2 SCS1
AFLC PRI GP 3 1-30 DAYS
DLA PRI GP 3 1-30 DAYS
GSA PRI GP 3 1-30 DAYS
LP PRI GP 3 1-30 DAYS
AFLC TOTAL PRI GP 3
DLA TOTAL PRI GP 3
GSA TOTAL PRI GP 3 SCS3
LP TOTAL PRI GP 3
AFLC OVERALL TOTAL
DLA OVERALL TOTAL
GSA OVERALL TOTAL
LP OVERALL TOTAL
TOTAL OVERALL TOTAL

Page 25
PART NUMBERS
*TOTAL REX
TCTO KIT
LOCALLY ASGND
PAST DUE INV-365

Page 26
L/I AUTH TOTAL
L/I DUE OUT TOTAL

Page 27
PRI GP 1
AFLC REC W/STD DAYS
AFLC REC W/175% STD
AFLC REC > 175% STD

FIGURE 14 (Continued).

```
DLA REC W/STD DAYS
DLA REC W/175% STD
DLA REC > 175% STD
GSA REC W/STD DAYS
GSA REC W/175% STD
GSA REC > 175% STD
LP REC W/STD DAYS
LP REC W/175% STD
LP REC > 175% STD
PRI GP 2
AFLC REC W/STD DAYS
AFLC REC W/175% STD
AFLC REC > 175% STD
DLA REC W/STD DAYS
DLA REC W/175% STD
DLA REC > 175% STD
GSA REC W/STD DAYS
GSA REC W/175% STD
GSA REC > 175% STD
LP REC W/STD DAYS
LP REC W/175% STD
LP REC > 175% STD
PRI GP 3
AFLC REC W/STD DAYS
AFLC REC W/175% STD
AFLC REC > 175% STD
DLA REC W/STD DAYS
DLA REC W/175% STD
DLA REC > 175% STD
GSA REC W/STD DAYS
GSA REC W/175% STD
GSA REC > 175% STD
LP REC W/STD DAYS
LP REC W/175% STD
LP REC > 175% STD

Page 31
COMPLETE
RECORD BALANCE TOTAL
TOTAL UNITS OVER TOTAL
$ VALUE OVERAGES TOTAL
TOTAL UNITS SHORT
$ VALUE SHORTAGES TOTAL
SPECIAL
RECORD BALANCE TOTAL
$ VALUE OVERAGES TOTAL
TOTAL UNITS SHORT
$ VALUE SHORTAGES TOTAL
```

FIGURE 14 (Continued).

Page 32
SALES ISU/DOR
IEU NBR L/I
TIC NBR L/I
BSS OTHER NBR L/I
RETURNS: TIN
IEU NBR L/I
TIC NBR L/I
BSS OTHER NBR L/I

FIGURE 14 (Continued).

APPENDIX C

MONTHLY CUSTOMER LIAISON CALL-IN ANALYSIS

MONTHLY CUSTOMER LIAISON CALL-IN ANALYSIS

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 12a(7).

Responsibility: In conjunction with the Management Analysis Section, perform a monthly analysis of all customer complaints or problems received. Compare current month's data with at least two month's previous data to determine trends.

Offices of Primary Responsibility (OPRs): Customer Liaison Office (CLO) and Management Analysis Section.

Software: ReportStar.

Hardware: Chromemco, System CS-2.

Manual Task Accomplishment Steps:

(1) The Customer Liaison and the management analyst review all WPAFB Forms 197, "Customer Liaison Worksheet," in file for the report month, 152 for December 1982, and gathers data in four categories (Figures 15-18). Time used: 360 minutes, average accomplishment time per month, based on an estimate by the Customer Liaison and the management analyst.

Computer Task Accomplishment Steps:

(1) Customer Liaison and/or management analyst learns the procedures for report generation software package. Time used: a one time requirement of 4.5 hours, for ReportStar.

(2) Customer Liaison and/or management analyst creates four standard report formats (Figures 19-22) ("Customer Liaison Call-Ins, By Call Type;" "Customer Liaison Call-Ins, By Activity Code;" "Customer Liaison Call-Ins, By Status Code;" and "Customer Liaison Call-Ins, By Organization Code") which utilize information stored in the Customer Liaison Worksheet File (Appendix D, CUSTOMER LIAISON WORK SHEETS (CLOWKSHT)). Time used: a one time requirement of 5 hours, for ReportStar.

(3) Customer Liaison and/or management analyst directs computer to sort completed Customer Liaison Worksheet File (CLOWKSHT), into four new files (CLOCALLS, CLOACTS, CLOSTATS, and CLOORGS), for the month of the analysis. Time used: 3 minutes, average processing time per month, based on sorting each of the four files six times.

(4) Customer Liaison and/or management analyst processes each of the four standard reports. Time used: 5 minutes average processing time per month for "Customer Liaison Call-Ins, By Call Type," from CLOCALLS; 7 minutes average processing time per month for "Customer Liaison Call-Ins, By Activity Code," from CLOACTS; 5 minutes average processing time per month for "Customer Liaison Call-Ins, By Status Code," from CLOSTATS; and 10 minutes average processing time per month for "Customer Liaison Call-Ins, By Organization Code," from CLOORGS; based on processing each of the four standard reports six times.

Analysis:

(1) Speed:

(a) Manual accomplishment of data gathering was estimated by the customer liaison and management analyst to be 360 minutes (6 hours) per month.

(b) Computerized accomplishment of data gathering (sorting CLOWKSHT into 4 new files and processing the four standard reports) was observed six times, the total average time was 39 minutes (Table 4).

(c) Based on the data presented, it appears that the task of gathering data for the analysis can be accomplished faster by the computer.

(2) Accuracy:

(a) Manual accuracy for gathering data was observed for seven areas of the analysis. These seven areas are identified in Table 5. Two areas could be reconciled with the current file of Customer Liaison Worksheets, while five areas could not.

(b) Computerized accuracy for gathering data was observed for the same seven areas. All areas could be reconciled with the current file (Table 5). (NOTE: The computer file was created from the current file, therefore, it was expected that all areas could be reconciled).

(c) Based on the data presented, it appears that data gathering and reconciliation is more accurate when the computer provides this information.

TABLE 4

Data Gathering

Step	Time Used, Minutes Per Run					
	Run A	Run B	Run C	Run D	Run E	Run F
Sorting						
CLOCALLS	3	4	3	3	3	3
CLOACTS	2	3	2	3	3	4
CLOSTATS	3	3	3	3	3	3
CLOORGS	3	2	3	3	2	3
Processing						
CLOCALLS	5	6	5	4	5	5
CLOACTS	6	8	7	7	8	7
CLOSTATS	4	5	5	5	6	5
CLOORGS	10	11	10	9	10	10

TABLE 5

Differences In Data Gathering

Method	Data Gathered, Per Area						
	1	2	3	4	5	6	7
Current File	157	5	3	2	4	7	1
Manually	152	7	3	6	3	8	1
Computer	157	5	3	2	4	7	1

Area 1: Number of Worksheets Completed.
Area 2: Number of "Non-receipt of Property" call-ins.
Area 3: Number of "Received Wrong Property" call-ins.
Area 4: Number of "Requisition Number" call-ins.
Area 5: Number of "PFMR Inquiry" call-ins.
Area 6: Number of "Requester's Name" call-ins.
Area 7: Number of "Nomenclature of Item" call-ins.

Subjective Observations:

(1) Manual Accomplishment:

(a) The CLO numbers on the WPAFB Forms 197, "Customer Liaison Worksheet," currently in file are not sequential, indicating that some worksheets have been removed from file (explaining the lower number of worksheets recorded in the analysis than currently in file) or some worksheets were numbered wrong.

(b) The decision of how to categorize a CLO call-in is subjective and will change depending on the individual reviewing the worksheet file (explaining the differences between the current file and the manual data gathering).

(c) Once the data gathering has been accomplished, if the Chief of Supply requests an in-depth analysis of a specific category, all the worksheets must be reviewed again to determine which were in that category. The subjective categorizing mentioned above may hinder this analysis as worksheets reviewed the second time may not be placed in the original category.

(d) The data gathered for organizations calling the CLO is currently aggregated at a macro level (all Wing Organization Codes (Org Codes) together, all Maintenance Org Codes together.) This degrades using this information to identify specific customers who possibly abuse the CLO function or require training.

(2) Computerized Accomplishment:

(a) Because of the ability to request needed information in any order from ReportStar additional "quick reports" may be created and printed (for the entire file) in approximately 20 minutes.

(b) Because each report can print the CLO number, the analyst can always determine which reports were categorized into a specific area.

(c) Because of the ability of ReportStar to print a hard copy of any worksheet, at any time, there should not be any worksheet data removed from the computer file. This would allow any previous report created, to be identical to one created in the future. (Unless an individual deletes a worksheet, or changes information contained in the file).

(d) Because ReportStar can sort by individual Org Codes and then print the Org Code, the individual's name, and Call-in Type, possible abuses or training needs could be identified easier.

CALL-IN TYPE	WORKSHEETS PREPARED	TOTAL
STATUS	IIIII IIIII...IIIII I	96
NON-RECPT OF PROPERTY	IIIII II	7
RECD WRONG PROPERTY	III	3
PRICE QUESTION	IIIII	5
WALKINS/WALK-THRUS	IIIII IIIII...IIIII III	33
VERIFY ERRC	I	1
ITEM DESCRIPTION	I	1
REQUISITION NUMBER	IIIII I	6
PFMR INQUIRY	III	3
REQUESTER'S NAME	IIIII III	8
NOMENCLATURE OF ITEM	I	1
MISCELLANEOUS	IIIII I	6
TOTAL		152

FIGURE 15.

CLO Data Gathered Manually, Call-Ins By Call Type

ACTIVITY CODE	ACTIVITY CODES IDENTIFIED*	TOTAL
K		0
P	IIIII IIIII...IIIII IIII	34
R	IIIII IIIII...IIIII II	47
E	IIIII IIIII...IIIII III	58
X	IIIII IIIII...IIIII	170
B	II	2
TOTAL		311

*Each worksheet may identify several activity codes.

FIGURE 16.

CLO Data Gathered Manually, Call-Ins By Activity Codes

STATUS CODE	STATUS CODES IDENTIFIED*	TOTAL
BP	IIIII III	8
BA		0
BB	IIIII I	6
BV	IIIII IIIII...IIIII III	28
BD	IIIII IIIII IIII	14
99	IIIII	5
ZF		0
B5	II	2
TOTAL		63

*Not all worksheets require a status code.

FIGURE 17.

CLO Data Gathered Manually, Call-Ins By Status Codes

ORGANIZATION	WORKSHEETS PREPARED	TOTAL
2750ABW	IIIII IIIII...IIIII IIII	29
FTD	IIIII III	8
AFIT	IIIII	5
906TFG	IIIII IIIII II	12
4950TW	IIIII IIIII IIIII IIIII	20
AFWAL	IIIII IIIII	10
AFLC/CASO	II	2
ASD	IIIII II	7
661AF BAND	II	2
AFLC	IIIII IIIII IIIII IIII	19
3553USAFRSQ	III	3
AFCOLR	III	3
MED CENTER	III	3
ILC	I	1
PMEL	II	2
2046CS	IIIII I	6
1815CES	III	3
AFML	I	1
AMRL	II	2
1361AVS	II	2
AFRES	I	1
DODWFAS	I	1
AF MUSEUM	IIII	4
AFJROTC	I	1
89TFG	II	2
AFALD	I	1
AFCMC	I	1
FLT DYN	I	1
TOTAL		152

FIGURE 18.

CLO Data Gathered Manually, Call-Ins By Organization

Customer Liaison Call-Ins, By Call Type
12/31/82

Call Type=01, Status

CALL TYPE	CLO NO	ORG	NAME	PHONE
01	234313	707	Mr. xxxxxxxxx	xxxxx
01	235403	761	Mr. xxxxx	xxxxx
01	235505	205	TSgt xxxxxxxx	xxxxx
01	236302	644	Mrs. xxxx	xxxxx

Summary for CALL TYPE 01 (Count = 4):

Call Type=02, Non-Receipt of Property

CALL TYPE	CLO NO	ORG	NAME	PHONE
02	236104	655	Mr. xxxxxx	xxxxx
02	234002	464	Sgt xxxxx	xxxxx

Summary for CALL TYPE 02 (Count = 2):

Summary for REPORT (Count = 6):

FIGURE 19.

CLO Data Gathered Computerized, Call-Ins By Call Type

Customer Liaison Call-Ins, By Activity Code
12/31/82

Activity Code=E, Equipment

ACT CODE	CLO NO	CALL TYPE	SUPPLY SOURCE	STATUS
E	235505	01	FPZ	BP

Summary for ACT CODE E (Count = 1):

Actvity Code=R, Routine

ACT CODE	CLO NO	CALL TYPE	SUPPLY SOURCE	STATUS
R	234002	02	NA	NA
R	234313	01	JBB	BD
R	236302	01	JBB	ZF

Summary for ACT CODE R (Count = 3):

Activity Code=X, Expedite

ACT CODE	CLO NO	CALL TYPE	SUPPLY SOURCE	STATUS
X	236104	02	NA	NA
X	235403	01	NA	CX

Summary for ACT CODE X (Count = 2):

Summary for REPORT (Count = 6):

FIGURE 20.

CLO Data Gathered Computerized, Call-Ins By Activity Codes

Customer Liaison Call-Ins, By Status Codes

```
STATUS CODE=BD, Delayed
STATUS CODE          SUPPLY SOURCE   CLO NO
BD                   JBB             234313
Summary for STATUS CODE BD (Count = 1):

STATUS CODE=BP, Being Procured
STATUS CODE          SUPPLY SOURCE   CLO NO
BP                   FPZ             235505
Summary for STATUS CODE BP (Count = 1):

STATUS CODE=ZF, Cancelled
STATUS CODE          SUPPLY SOURCE   CLO NO
ZF                   JBB             236302
Summary for STATUS CODE ZF (Count = 1):

Summary for REPORT (Count = 6):
```

FIGURE 21

CLO Data Gathered Computerized, Call-Ins By Status Codes

Customer Liaison Call-Ins, By Organization Code

```
ORG CODE=205, 1815TES
ORG CODE  ACT CODE  NAME                PHONE      CLO NO
205       E         TSgt xxxxxxxx       xxxxx      235505
Summary for ORG CODE (Count = 1):

ORG CODE=464, Det 2, AVS
ORG CODE  ACT CODE  NAME                PHONE      CLO NO
464       R         Sgt xxxxx           xxxxx      234002
Summary for ORG CODE (Count = 1):

ORG CODE=761, 906TFG
ORG CODE  ACT CODE  NAME                PHONE      CLO NO
761       X         Mr. xxxxx           xxxxx      235403
Summary for ORG CODE (Count = 1):

Summary for REPORT (Count =6):
```

FIGURE 22.

CLO Data Gathered Computerized,
Call-Ins By Organization Codes

APPENDIX D

CUSTOMER LIAISON WORKSHEETS

CUSTOMER LIAISON WORKSHEETS

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 12a(1).

Responsibility: Record customer complaints and inquiries.

Office of Primary Responsibility (OPR): Customer Liaison Office (CLO).

Software: DataStar and ReportStar.

Hardware: Chromemco, System CS-2.

Manual Task Accomplishment Steps:

(1) Customer Liaison prepares WPAFB Form 197, "Customer Liaison Worksheet," for each call which requires his action, 162 prepared for December 1982. Time used: 15 minutes per worksheet, based on averaging six call-ins for which worksheets were prepared (Figures 23-28).

(2) Customer Liaison annotates "Customer Liaison Call-In Log," with the name of the caller, the subject of the call, CLO number, number of items called in, and date completed; for each Customer Liaison Worksheet prepared that month. Time used: 25 seconds per worksheet, based on annotating information from six worksheets onto call-in log (Figure 29).

(3) Customer Liaison annotates filing designator, specifically "File 3 Sup 1-3," on the upper right-hand corner of each Customer Liaison Worksheet prepared. Time used: 10 seconds per worksheet, based on averaging six annotations to worksheets prepared (Figures 23-28).

(4) Customer Liaison files Customer Liaison Worksheets when complete. Time used: 1 minute per worksheet, based on averaging the filing of six worksheets.

Computer Task Accomplishment Steps:

(1) Customer Liaison learns procedures for form generation software package. Time used: a one time requirement of 6 hours, for DataStar and ReportStar.

(2) Customer Liaison creates form input image for the "Customer Liaison Worksheets" (Figure 30). Time used: a one time requirement of 1.5 hours, for DataStar.

(3) Customer Liaison creates a standard report format for the "Customer Liaison Call-In Log." Time used: a one time requirement of .5 hours, for ReportStar.

(4) Customer Liaison enters the information for each call which requires his action, 157 for December 1982. Time used: 15 minutes average per worksheet, based on the time required for six call-ins for which worksheets were prepared (Figures 23-28).

(5) Customer Liaison processes "Customer Liaison Call-In Log" report at the end of the month. Time used: 10 minutes per month (which equates to 4 seconds for each worksheet for December 1982), based on averaging six processings of the report (Figure 29).

Analysis:

(1) Speed:

(a) Manual accomplishment of the worksheets was observed six times, the time used was 15 minutes for each worksheet. Manual accomplishment of the "Customer Liaison Call-In Log" was observed six times, the average time was 25 seconds for each worksheet (Table 6).

(b) Computerized accomplishment of the worksheets was observed six times, the time used was 15 minutes for each worksheet (Table 6). Computerized accomplishment of the report "Customer Liaison Call-In Log" at the end of the month, was observed six times, the average time was ten minutes for processing the report, equating to four seconds for each worksheet (Table 7).

(c) Based on the data presented, it appears that the task of preparing the worksheet is the same regardless of method used. However, based on the data presented, it appears that the task of preparing the call-in log can be accomplished faster when computerized versus manually.

(2) Accuracy:

(a) Manual accuracy for worksheet preparation was observed for 157 worksheets in file, there was one duplicate CLO Number assigned (233504).

(b) Computerized accuracy for worksheet preparation was observed for the same 157 worksheets, there were no duplicate CLO Numbers assigned. (NOTE: This is to be expected as the form input software prevents duplicate CLO Number assignment).

(c) Based on the data presented, it appears that duplicate CLO Numbers will be eliminated if computerized.

TABLE 6

Customer Liaison Work Sheet Preparation

Method	Time Used, Minutes Per Work Sheet					
	1	2	3	4	5	6
Manually	20	10	13	22	20	5
Computerized	18	9	14	24	19	5

TABLE 7

Customer Liaison Call-In Log Preparation

Method	Time Used, Seconds Per Work Sheet Entry					
	1	2	3	4	5	6
Manually	28	22	20	32	25	24
Computerized*	4	4	4	4	4	4

* obtained by rounding the results of dividing 157 entries by the 10 minutes a month taken to prepare report.

TABLE 8

Annotating File Designator

Method	Time Used, Seconds Per Work Sheet					
	1	2	3	4	5	6
Manually	10	10	10	10	10	10
Computerized*	0	0	0	0	0	0

* FormGen has file designator automatically.

Worksheet 1: CLO Number 234002
Worksheet 2: CLO Number 234313
Worksheet 3: CLO Number 235403
Worksheet 4: CLO Number 236104
Worksheet 5: CLO Number 236302
Worksheet 6: CLO Number 235505

Subjective Observations:

(1) Manual Accomplishment:

(a) There were 11 CLO Numbers, out of 157, which were very difficult to read.

(b) All individuals which would fill the Customer Liaison position can write, but may not be proficient at typing.

(c) According to the CLO Numbers assigned, 15 worksheets were removed from the file, but could not be accounted for.

(2) Computerized Accomplishment:

(a) Problems with reading the handwriting of the Customer Liaison would be eliminated.

(b) Because of the ability of ReportStar to print a hard copy of any worksheet, at any time, there should not be any worksheets removed from the computer file. (Unless an individual purposely deletes a worksheet).

(c) Because of ReportStar's ability to print the "Customer Liaison Call-In Log" without assistance, the Customer Liaison may accomplish other required tasks.

DAB

CUSTOMER LIAISON WORKSHEET 234002

NAME (Last, First, Middle Initial): SGT [redacted] (WALK-IN) | DATE: 6 Dec 82

ORGANIZATION: Det 2 AVS/LGQ | TELEPHONE NO.: [redacted]

SUBJECT: Non-Receipt of Property

COMPLAINT/INQUIRY:

5835ØØ969192Ø R464PD232ØØØ9 12 ea 6 B10 6 ISU Out of stock on 2327 (23 Nov 82) Why hasn't it been delivered yet?

FINDINGS/ACTION TAKEN: Checked Pre-Del list Document #s on list. Called-Mr [redacted] Whse 15. He said he had property in stock but has not received ISSUE Document yet! Checked TR Document locked out on Remot located in Bld 257. Per help D.P personnel handscribed Duplicate ISU Document, [redacted] (Inventory) was going to Whse and hand carried Document to Mr [redacted]

Contacted TSGT [redacted] @ 130 6 Dec 82 He will call if item is not received by the 7th of Dec.

Completed 6 Dec 82

SGT [redacted]

WPAFB FORM 197 JUN 72

FIGURE 23.

CLO Worksheet Number 234002

10

DAB

CUSTOMER LIAISON WORKSHEET 2343-13

NAME (Last, First, Middle Initial): Mr [redacted]

DATE: 9 Dec 82

ORGANIZATION: 2750 ABW

TELEPHONE NO.: [redacted]

SUBJECT: STATUS (Customer came to office)

COMPLAINT/INQUIRY:

1.) 5110P02N01 R707WY2292ØØ47

2.) 7290P01041923ØP R 707WY2293ØØ02

FINDINGS/ACTION TAKEN:

1.) BD 2359

2.) BD 2357

Gave info to Mr [redacted] @0700

Completed @ 0900 9 Dec 82

SA [redacted]

WPAFB FORM JUN 78 197

FIGURE 24.

CLO Worksheet Number 234313

File 3 Sup 1-3 1293

CUSTOMER LIAISON WORKSHEET 2354-3

NAME (Last, First, Middle Initial)	DATE
Mr [redacted]	20 Dec 82
ORGANIZATION: 906 ITFG / TNS Shop	**TELEPHONE NO.** [redacted]

SUBJECT:
STATUS

COMPLAINT/INQUIRY:
5913 000691940 X761NS 2343Ø117

FINDINGS/ACTION TAKEN:
Number on 2005 was 5913001691940 and was cap by D.P. NISL. I check IL & ML using stock # 5913000691940 also used class 5930 and number is not listed.

Contacted Mr [redacted] @ 1215 instructed him to submit requirement on -6 also give a TO reference if one exists.

Completed @ 1215 20 Dec 82
Sgt [redacted]

WPAFB FORM JUN 72 197

FIGURE 25.

CLO Worksheet Number 235403

File 3 Sup 1-3 OAB

CUSTOMER LIAISON WORKSHEET 2361 - 4

NAME (Last, First, Middle Initial): Mr [redacted]

DATE: 27 Dec 82

ORGANIZATION: 4950/TW

TELEPHONE: [redacted]

SUBJECT: (Wall-Chu) Non-Receipt of Property (Priority 04 BW)

COMPLAINT/INQUIRY:

8Φ1ΦΦ2854863 x655AB2348ΦΦ8

ISSUED on Dec 15 has not been received and work stopage exists!

(Item is on Pre-Del list) Document is also Fileable

FINDINGS/ACTION TAKEN: Called WShe 10 gal are still in location, have not received ISSue Document yet. Called 237 Storage & Issue Remote room no record of Document, called P&D no record of document — called [redacted] (Taking Mr [redacted] place while on leave) he said make up a Dupe Document and send customer to Whse 02 and get property.

Completed @ 12:30 24 Dec 82

Sgt [redacted]

Note: This is a continuing problem and would like subject brought up at how goes it meeting! Or make reference in Monthly CLO ~~Surveillance~~ Survivance done by M&P.

WPAFB FORM JUN 78 197

FIGURE 26.

CLO Worksheet Number 236104

Fil. 3 Lyd-3

CUSTOMER LIAISON WORKSHEET 236302

NAME (Last, First, Middle Initial) [redacted] DATE: 29 Dec 82

ORGANIZATION: [redacted] TELEPHONE NO.: [redacted]

SUBJECT: STATUS

COMPLAINT/INQUIRY:

752ØØ1ØØ559518 R644BI2194ØØ27

FINDINGS/ACTION TAKEN: Did Transaction history:

2196 day FIL processed to load item - JBB
2196 " DUO processed to establis Due-out
2196 " AØE Processed FB23ØØ2196 Ø243.
2257 LCC Canx by procurement Non-Receipt of 1348-6.
2306 AØA Processed to re-requisition item FB23ØØ ~~2306~~ 2304P177
2341 LCC Cax by procurment! no - 6.

Checked CIAPS - ~~Does~~ Stock # and disciption are not loaded. ~~no~~

Contacted Mrs [redacted] @ 3:45

Instructed her to ~~call~~ rather canx request and re-submit on 1348-6 - complete discription as item is JBB, it is a first request to procurment and the discription in IL is very sketchy.

WPAFB FORM JUN 75 197

FIGURE 27.

CLO Worksheet Number 236302

File 3 Tab 1-3

CUSTOMER LIAISON WORKSHEET 2355-5

NAME (Last, First, Middle Initial)	DATE
TSgt [redacted]	21 DEC 82
ORGANIZATION	TELEPHONE [redacted]
1815 TES	

SUBJECT:
STATUS

COMPLAINT/INQUIRY:

1 - E205DA23260003
2 - E205DA23260004
3 - E205DA23370005
4 - E205DA23430006

FINDINGS/ACTION TAKEN:

1 - BP - 3165
2 - BP - 3165
3 - BB - 3165
4 - BB - 3165

Notified TSgt [redacted]
Completed 22 Dec 82/0750
[redacted]

WPAFB FORM JUN 78 197

FIGURE 28.

CLO Worksheet Number 235505

Customer Liaison Call-In Log
12/31/83

NAME	SUBJECT	CLO NO	ITEMS	COMPLTD
Sgt xxxxx	Non-Receipt	234002	1	6Dec82
Mr. xxxxxx	Status	234313	2	9Dec82
Mr. xxxxx	Status	235403	1	20Dec82
TSgt xxxxxxxx	Status	235505	4	22Dec82
Mr. xxxxxxx	Non-Receipt	236104	1	27Dec82
Mrs. xxxx	Status	236302	1	29Dec82

FIGURE 29.

Computerized Customer Liaison Log

CLOWKSHT FORM LISTING AND FIELD ATTRIBUTE DEFINITIONS

CONTENT CONTROL MASK

File 3 Sup 1-3

CUSTOMER LIAISON WORKSHEET

CLO NO: 999999

NAME (Last, First, Middle Initial)

DATE:

ORGANIZATION:

TELEPHONE NO:
999-9999

SUBJECT:

COMPLAINT/INQUIRY: Call/Type: 99

Status Code: EE

NSN: 9999-FFFFFFFFFFFF

SUPPLY SOURCE: AAA

ACTIVITY: A ORG: 999 SHOP: EE JULIAN: 9999 DOC NO: 9999

FINDINGS/ACTION TAKEN:

Date Completed: 9999

FIGURE 30.

CLO Worksheet Input Screen Format

APPENDIX E

OFFICER EFFECTIVENESS REPORT (OER) PREPARATION

OFFICER EFFECTIVENESS REPORT (OER) PREPARATION

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 8c.

Responsibility: Accomplish those functions of squadron administration (monitor OER, APR, duty assignments, and AFSC changes).

Office of Primary Responsibility (OPR): Each branch administrative section.

Software: WordStar.

Hardware: Chromemco, System CS-2.

Manual Task Accomplishment Steps:

(1) Supervisor prepares handwritten draft of OER.

(2) Clerk-typist prepares a typed version of the draft in double-spaced format, correcting spelling mistakes as detected. Time used: 16 minutes, average for the information presented in BLOCKS I through VI; 4 minutes average for the information presented in BLOCKS VII and VIII (Figures 31 and 32).

(3) Supervisor proof-reads draft, annotates grammatical corrections/improvements, and any spelling corrections.

(4) Clerk-typist types finalized version of OER onto AF Form 707, "Officer Effectiveness Report." Proof-reads for typing errors and corrects these errors. Time used: 25 minutes, average for BLOCKS I through VI; 5 minutes, average for BLOCKS VII and VIII (Figures 31 and 32).

(5) Supervisor proof-reads finalized version, identifies any additional typing errors. Signs, dates, and marks report if no revisions are required.

(6) Additional rater and indorser accomplish steps 2 through 5. Signs, dates, and marks report if no additional changes are required.

(7) Clerk-typist submits report to Personnel Division. (NOTE: AFIT Personnel Division records indicate 26% of the reports submitted have errors, causing steps 4 through 7 to be reaccomplished).

Computer Task Accomplishment Steps:

(1) Clerk-typist learns procedures for word processing software package. Time used: a one time requirement of 5 hours, average for WordStar.

(2) Clerk-typist creates standard format for inputting information for OER (Figure 33). Time used: a one time requirement of 20 minutes.

(3) Supervisor prepares handwritten draft of OER.

(4) Clerk-typist inputs draft version of OER into a computer file and prepares a typed version using the word processing software package. Time used: 15 minutes, average for the information presented in BLOCKS I through VI; 4 minutes, average for the information presented in BLOCKS VII and VIII (Figures 31 and 32), based on six printings of the draft.

(5) Supervisor proof-reads the draft, annotates grammatical corrections/improvements, and any spelling corrections.

(6) Clerk-typist corrects draft version of OER in small computer file, and prepares a typed version using word processing software package. Time used: 6 minutes, average for ten changes of information presented in BLOCKS I through VI; 4 minutes, average for three changes of information presented in BLOCKS VII and VIII (Figures 31 and 32), based on six printings of the final OER.

(7) Supervisor proof-reads finalized version, identifies any additional typing errors. Signs, dates, and marks report if no revisions are required.

(8) Additional rater and indorser accomplish steps 2 through 5. Signs, dates, and marks report if no additional changes are required.

(9) Clerk-typist submits report to Personnel Division. (NOTE: AFIT Personnel Division records indicate 26% of the reports submitted have errors, causing steps 6 through 9 to be reaccomplished).

Analysis:

(1) Speed:

(a) Manual preparation of the draft OER was observed once, requiring 20 minutes to complete. Manual preparation of the finalized OER was observed once, the time used was 30 minutes (Table 9).

(b) Computerized preparation of the draft OER was observed six times, the average time was 19 minutes (Table 9). Computerized preparation of the finalized OER was observed six times, the average time was 10 minutes (Table 9).

(c) Based on the data presented, it appears that the tasks of preparing draft and final OERs can be accomplished faster when computerized.

(2) Accuracy:

(a) Accuracy for the OER prepared manually was based on the number of typing errors which occurred and were corrected as the finalized OER was prepared. There were three errors for this OER (Table 10).

(b) Accuracy for the OER prepared by the computer was based on the number of typing errors which occurred and had to be corrected. There were no errors (Table 10). (NOTE: This does not consider preparation of draft copy number 3 (Tables 9 and 10), which was deemed useless because the paper caught on the printer, ripped and overprinted on draft.)

(c) Based on the data presented, it appears that the computer can prepare the draft and final OERs with greater accuracy.

TABLE 9

Officer Effectiveness Report (OER) Preparation

Method Preparation	Time Used, Minutes Per OER					
	1	2	3	4	5	6
Manually						
Draft	20*	20*	20*	20*	20*	20
Final	30*	30*	30*	30*	30*	30
Computerized						
Draft	19	19	20**	19	18	19
Final	10	9	10	10	9	10

** Third draft OER prepared was damaged due to author's error and was deemed useless.

TABLE 10

Errors In Preparation

Method	Errors, Per OER Preparation					
	1	2	3	4	5	6
Manually	3*	3*	3*	3*	3*	3
Computerized	0	0	0	0	0	0

* Estimated based on OER 6.

Subjective Observations:

(1) Manual Accomplishment:

(a) Although the three typing errors on the finalized OER were corrected, it was still possible to detect these corrections.

(2) Computerized Accomplishment:

(a) Because of the ability of WordStar to print the OER without assistance, the clerk-typist may accomplish other required tasks.

(b) Originally the OER standard format contained both the front and back portions of the form, however, each time I tried to print these in succession, the information for the back was not properly positioned and would over-strike characters on top of characters. I had to split the form into two files (OERFRONT and OERBACK) to compensate for the problem. No explanation could be determined for the problem.

(c) WordStar has a companion software package SpellStar which should check spelling within a WordStar file. However, each time I used the option, the system would terminate SpellStar, terminate WordStar, and alter the mode of the terminal. Again, no explanation could be determined for the problem.

DOE, JOHNATHON L. | 123-45-6789 | Captain | 6424

Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio | 12345

1 June 82 | 27 Sept 83 | 450 | PCS

Instructor

Analyzes, designs, writes, modifies, and tests computer programs to support over 1000 faculty, staff, and students. Maintains proficiency and provides assistance and guidance in the use of multiple computer systems and their differing operating systems. Conducts systems analyses and feasibility studies for the preparation of functional descriptions and system/subsystem specifications. Provides programming guidance and recommendations for effective use of computer software programs and hardware resources. Conducts consultation for AFIT faculty on the use of computer resources for academic and educational purposes.

III. PERFORMANCE FACTORS

(Specific examples of performance required)	NOT OBSERVED	FAR BELOW STANDARD	BELOW STANDARD	MEETS STANDARD	ABOVE STANDARD	WELL ABOVE STANDARD
1. JOB KNOWLEDGE (Depth, currency, breadth)	O					

Unsurpassed. Selected by the Director of Civil Engineering to develop mechanical engineering inputs for the $1 billion Israeli Air Base relocation program. Proposal adopted.

2. JUDGMENT AND DECISIONS (Consistency, quality, effective	O					

Sought as consultant. Assesses technical problems and determines solution method. Developed feasible approach to critical problem in aerodynamic buzz of engine inlets.

3. PLAN AND ORGANIZE WORK (Initiative, foresight,	O					

Totally effecient. Organized, scheduled, and directed departmental theses presentations. Observes and capitalizes on slack periods to increase utilization of computer.

4. MANAGEMENT OF RESOURCES (Human, financial, material)	O					

Meets the challange. Caliber and quantity of staff work under his direction were specifically praised by the ATC inspection team.

5. LEADERSHIP (Initiative, acceptance of responsibility,	O					

Superior. Finest I've ever seen. Leads by example and moral force. Always out in front. Hardest worker at AFIT. Has gained the respect and confidence of all--including faculty.

6. ADAPTABILITY TO STRESS (Stamina, ability to perform	O					

Immune to pressure. Routinely demonstrates the ability to coordinate and conduct three and four special projects in addition to normal job responsibilities. Result--"good management practices" as observed by the inspector general.

7. ORAL COMMUNICATION (Clear, concise, organized)	O					

Relates to his audience. Presented excellent briefings on casuality notification procedures and training on awards and decorations.

8. WRITTEN COMMUNICATION (Clear, concise, organized)	O					

Exceptional capabilities. One of the best I've seen in preparing concise, hard-hitting correspondence and reports.

9. PROFESSIONAL QUALITIES (Attitude toward duty, self-control, appearance)	O					

He is in the mold of the "traditional professional officer". Impeccable manners and appearance that inspire respect and trust.

10. HUMAN RELATIONS (Cooperation, consideration for others,						

Considerate in respecting rights of others. Intiated departmental program for recognizing student achievement. Skillful in handling personal and academic problems of 32 students.

AF FOR NOV 80 707 PREVIOUS EDITION WILL BE USED. OFFICER EFFECTIVENESS REPORT

FIGURE 31.

Officer Effectiveness Report (OER) Front

IV. ASSIGNED RECOMMENDATION — SUPPLEMENTARY: Emerges as leader in group activities

DUTY ASSIGNED: Personnel Staff Officer (7316)

ORGANIZATION LEVEL: MAJCOM — YEARS: 1984

V. EVALUATION OF POTENTIAL

Mark (X) in the designated portion of the most appropriate block

RATER	ADDN RATER	INDORSER	RATER	ADDN RATER	INDORSER	RATER	ADDN RATER	INDORSER	RATER	ADDN RATER	INDORSER

LOWEST ◄ ► HIGHEST

VI. RATER COMMENTS

Top producer for 1980 of nine officers in department. Taught four and one-half courses, one of which was a totally a new course in advanced flight mechanics. Developed and presented two entirely new courses in the Professional Continuing Education program and assisted by preparing and presenting major blocks of instruction in two others. During this past year, Captain Doe published three papers, presented four, and directed four thesis. He developed education plans for 32 new graduate students and made major contributions to the administration of the department. As chairman of the curriculum committee for the major program in the department, he developed material necessary for the reaccreditation of the curriculum, prepared and presented the program in external review, evaluated requirments for curriculum modification, and led the faculty in developing a revised curriculum. Captain Doe has made solid contributions to the full range of departmental activity. His demonstrated leadership skills and administrative ability warrent his promotion to major well ahead of his contemporaries.

NAME, GRADE, BR OF SVC, ORGN, COMD, LOCATION	DUTY TITLE	DATE
RATER, Rank, USAF AF Institute of Technology (AU) Wright-Patterson AFB OH	Title SSAN	SIGNATURE SSAN

VII. ADDITIONAL RATER COMMENTS — ☐ CONCUR ☐ NONCONCUR

Captain Doe has the most important job in my organization. He executes that job flawlessly He is indispensable to my Education With Industry program whose continued success is due to Captain Doe's motivation and hard work. He is head and shoulders above his peers and clearly must be augmented and elected for service school to exploit his unlimited potential. Promote in the secondary zone.

NAME, GRADE, BR OF SVC, ORGN, COMD, LOCATION	DUTY TITLE	DATE
ADDITIONAL RATER, Rank, USAF AF Institute of Technology (AU) Wright-patterson AFB OH	Title SSAN	SIGNATURE SSAN

VIII. INDORSER COMMENTS — ☐ CONCUR ☐ NONCONCUR

Captain Doe is my idea of a completely professional officer. His enthusiasm for his job is infectious. I'm very impressed with the way he confidently stepped into his challenging new position and gained complete contol of what is probably our most complicated educational program. His outstanding professionalism and leadership abilities were evidenced by his superb performance as unit key worker in the 1980 Combined Federal Campaign. Through his exemplary efforts, his unit achieved 176% of its goal. I'm proud to have Captain Doe on the AFIT team and heartily recommend him for early promotion and attendance at Air Command and Staff College.

NAME, GRADE, BR OF SVC, ORGN, COMD, LOCATION	DUTY TITLE	DATE
INDORSER, Rank, USAF AF Institute of Technology (AU) Wright-Patterson AFB OH	Title SSAN	SIGNATURE SSAN

FIGURE 32.

Officer Effectiveness Report (OER) Back

```
.. leave all blank lines between the double dots in this file
.. set right margin to 93 <^OR93cr>
.. when printing position print line at first print line
.. print each page to a seperate file then use <letter>
.. turn insert off
.sw 10
.op
.mt 0
.mb 0
NAME                                    SSAN                    RANK          AFSC
..

..
Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio                PAS CODE
..

..
      FROM                  THRU                    DAYS            REASON
                        Duty Title
..                            <enter duty description for 9 lines>
                              Analyzes, designs, writes, modifies, and tests computer
programs to support over 1000 faculty, staff, and students. Maintains proficiency and
provides assistance and guidance in the use of multiple computer systems and their differing
operating systems. Conducts systems analyses and feasibility studies for the preparation of
functional descriptions and system/subsystem specifications. Provides programming guidance
and recommendations for effective use of computer software programs and hardware resources.
Conducts consultation for AFIT faculty on the use of computer resources for academic and
educational purposes.

..



..
<enter each block...3 lines each..1 blank line between>
.pa
                                                  Strongest Qualification
                          Suggested Job and AFSC
                          Level                                Timing
..

..
<enter 13 lines of rater comments>
..

..
RATER, Rank, USAF                       Title
AF Institute of Technology (AU)
Wright-Patterson AFB OH                 SSAN
..

..
<enter 7 lines of additional rater comments>
..

..
ADDITIONAL RATER, Rank, USAF            Title
AF Institute of Technology (AU)
Wright-patterson AFB OH                 SSAN
.pa
.. set spacing 2
Suggested Indorser Comments [redacted]
<enter comments to your heart's content>
```

FIGURE 33.

Officer Effectiveness Report (OER) Input Screen Format

APPENDIX F

WELCOME LETTER PREPARATION

WELCOME LETTER PREPARATION

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 8c.

Responsibility: Accomplish those functions of squadron administration (monitor OER, APR, duty assignments, and AFSC changes).

Office of Primary Responsibility: Squadron Section.

Software: WordStar and MailMerge.

Hardware: Chromemco, System CS-2.

Manual Task Accomplishment Steps:

(1) Clerk-typist prepares an original of a welcome letter after inserting 8 variables (Figure 34), for each newly assigned individual. Time used: 12 minutes per letter, based on the average time to prepare a letter (Figure 35).

Computer Task Accomplishment Steps:

(1) Clerk-typist learns procedures for word processing software package. Time used: a one time requirement of 5 hours, for WordStar, including MailMerge.

(2) Clerk-typist creates form letter file and input screen format (Figure 36). Time used: a one time requirement of 10 minutes.

(3) Clerk-typist enters 13 variables and prints the welcome letter. Time used: 8 minutes per letter, based on the average time for preparing six welcome letters (Figures 37-38).

Analysis:

(1) Speed:

(a) Manual accomplishment of the letter was observed two times, the average time used was 12 minutes (Table 11).

(b) Computerized accomplishment of the letter was observed six times, the average time was eight minutes (Table 11).

(c) Based on the data presented, it appears that the task of preparing welcome letters can be accomplished faster through computerization.

(2) Accuracy:

(a) Manual accuracy for preparing the letter was based on the average number of typing errors which occurred and were corrected as the two letters were prepared. There were 5.5 errors per letter (Table 12).

(b) Computerized accuracy for preparing the letters was based on the average number of typing errors which occurred and had to be corrected after the letters were prepared. There were no errors (Table 12).

(c) Based on the data presented, it appears that the number of typing errors will be lower when the computer is used to prepare the welcome letter.

TABLE 11

Welcome Letter Preparation

Method	Time Used, Minutes Per Letter					
	1	2	3	4	5	6
Manually	12*	12*	12*	12*	11	12
Computerized**	8	8	9	8	8	8

TABLE 12

Errors In Preparations

Method	Errors Per Letter					
	1	2	3	4	5	6
Manually	5*	5*	5*	5*	5	6
Computerized**	0	0	0	0	0	0

* Estimated based on letters 5 and 6.

** Preparing all letters, in succession, using a data file containing all six names was accomplished in 17 minutes, however, letters 2 through 5 were completely useless. No explanation for the problem could be identified.

Letter 1: Sgt William L. Smith
Letter 2: Capt James R. Burk
Letter 3: MSgt Marga E. Slick
Letter 4: CMSgt Report N. Time
Letter 5: TSgt Apples N. Oranges
Letter 6: 2Lt Joe Schmuck

Subjective Observations:

(1) Manual Accomplishment:

(a) None.

(2) Computerized Accomplishment:

(a) Because WordStar can print the letter without assistance, after the variables have been entered, the clerk-typist may accomplish other required tasks.

(b) A companion program to WordStar, MailMerge, is designed to allow the user to prepare a file of the variables, which is then accessed by WordStar for preparation of the form letter. However, each time I used these programs together, only the first welcome letter was prepared correctly. Welcome letters two through six were not properly positioned on the paper and some characters would over-strike those already printed (Figure 39). These letters could not be used and no explanation could be determined.

DEPARTMENT OF THE AIR FORCE
2750TH LOGISTICS SQUADRON (AFLC)
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

(variable 1)

(variable 2)

Dear (variable 3)

Welcome to Wright-Patterson Air Force Base. I am looking forward to meeting you and having you as a member of the 2750th Logistics Squadron. I believe that you will find your assignment to the Logistics Squadron rewarding for both you and the Air Force Logistics Command.

(variable 4) Branch, telephone (513) (variable 5), GP Autovon 787-(variable 6) has been appointed as your sponsor. Don't hesitate to call on (variable 7) with problems or questions on your assignment with us.

You should have already received some information on the Base and the local area. In this regard, let me remind you of the Air Force requirement that you report to the Housing Referral Office in Building 2 prior to making any commitments for housing.

Until you are settled here, you should have all mail forwarded to General Delivery-PSC Wright-Patterson AFB, Ohio 45433. For your convenience I'm including the Billeting Office's location and number. The Transient Lodging Facility (TLF) is located in Bldg 828, Area A, the office symbol is 2750 ABW/SVHO and the Autovon is 787-3451.

I hope your move will be completed satisfactorily and that you will enjoy your tour with the 2750th Logistics Squadron. Once again welcome.

Sincerely

(variable 8)

FIGURE 34.

Sample Welcome Letter, With Variables Identified

DEPARTMENT OF THE AIR FORCE
2750TH LOGISTICS SQUADRON (AFLC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

4 August 1983

AB [redacted]
3762 Student Squadron
Sheppard AFB, Texas 76311

Dear AB [redacted]

Welcome to Wright-Patterson Air Force Base. I am looking forward to meeting you and having you as a member of the 2750th Logistics Squadron. I believe that you will find your assignment to the Logistics Squadron rewarding for both you and the Air Force Logistics Command.

A1C [redacted], Transportation Branch, (513) 257-2088, GP Autovon 787-2088 has been appointed as your sponsor. Don't hesitate to call on him with problems or questions on your assignment with us.

You should have already received some information on the Base and local area. On this regard, let me remimd you of the Air Force requirement that you report to the Housing Referral Office in Building 2 prior to making any commitments for housing.

Until you are settled here, you should have all mail forwarded to General Delivery-PSC Wright-Patterson AFB, Ohio 45433. For your convenience I'm including the Billeting Office's location and number. The Transient Lodging Facility (TLF) is located in Bldg 828, Area A, the office symbol is 2750 ABW/SVHO and the Autovon is 787-3451.

I hope your move will be completed satisfactorily and that you will enjoy your tour with the 2750th Logistics Squadron. Once again welcome.

Sincerely

[redacted], Captain, USAF
Squadron Section Commander

FIGURE 35.

Manually Prepared Welcome Letter

&DATE&

&RANK& &FIRST& &MIDDLE& &LAST&
&STREET&
&ADDR&

Dear &RANK& &LAST&

Welcome to Wright-Patterson Air Force Base. I am looking forward to meeting you and having you as a member of the 2750th Logistics Squadron. I believe that you will find your assignment to the Logistics Squadron rewarding for both you and the Air Force Logistics Command.

&SPON& Branch, telephone (513) &TEL&,
GP Autovon 787-&AUTO& has been appointed as your sponsor. Don't hesitate to call on &SEX& with problems or questions on your assignment with us.

You should have already received some information on the Base and the local area. In this regard, let me remind you of the Air Force requirement that you report to the Housing Referral Office in Building 2 prior to making any commitments for housing.

Until you are settled here, you should have all mail forwarded to General Delivery-PSC Wright-Patterson AFB, Ohio 45433. For your convenience I'm including the Billeting Offices's location and number. The Transient Lodging Facility (TLF) is located in Bldg 828, Area A, the office symbol is 2750 ABW/SVHO and the Autovon is 787-3451.

I hope your move will be completed satisfactorily and that you will enjoy your tour with the 2750th Logistics Squadron. Once again welcome.

Sincerely

I M COMMANDING, Captain, USAF
Squadron Section Commander

FIGURE 36.

Computerized WordStar Form Letter File
and Input Screen Format

Please enter the information required for these data fields. When you have completed the information for any given field, you must push the "ENTER" key.

Today's Date:
New Arrival's Rank:
New Arrival's First Name:
New Arrival's Middle Initial:
New Arrival's Last Name:
New Arrival's Mailing Address:
New Arrival's City, State Zip (include the comma):
Sponsor's Rank, First Name, Last Name (exclude the commas):
Sponsor's Seven Digit Work Telephone Number:
Sponsor's Four Digit Work Telephone Number:
Sponsor's Appropriate Pronoun (him or her):

FIGURE 36 (Continued).

4 Aug 83

Sgt William L. Smith
1412 Lincoln Ave
Tacoma, Wa 92345

Dear Sgt Smith

Welcome to Wright-Patterson Air Force Base. I am looking forward to meeting you and having you as a member of the 2750th Logistics Squadron. I believe that you will find your assignment to the Logistics Squadron rewarding for both you and the Air Force Logistics Command.

SSgt Roger Jones, Supply Branch, telephone (513) 257-1212, GP Autovon 787-1212 has been appointed as your sponsor. Don't hesitate to call on him with problems or questions on your assignment with us.

You should have already received some information on the Base and the local area. In this regard, let me remind you of the Air Force requirement that you report to the Housing Referral Office in Building 2 prior to making any commitments for housing.

Until you are settled here, you should have all mail forwarded to General Delivery-PSC Wright-Patterson AFB, Ohio 45433. For your convenience I'm including the Billeting Offices's location and number. The Transient Lodging Facility (TLF) is located in Bldg 828, Area A, the office symbol is 2750 ABW/SVHO and the Autovon is 787-3451.

I hope your move will be completed satisfactorily and that you will enjoy your tour with the 2750th Logistics Squadron. Once again welcome.

Sincerely

I M COMMANDING, Captain, USAF
Squadron Section Commander

FIGURE 37.

Computer Prepared Welcome Letter 1

4 Aug 83

Capt James R. Burk
120 Apple St
St Louis, Mo 34213

Dear Capt Burk

Welcome to Wright-Patterson Air Force Base. I am looking forward to meeting you and having you as a member of the 2750th Logistics Squadron. I believe that you will find your assignment to the Logistics Squadron rewarding for both you and the Air Force Logistics Command.

Capt Ted Berry, Transportation Branch, telephone (513) 257-2322, GP Autovon 787-2322 has been appointed as your sponsor. Don't hesitate to call on him with problems or questions on your assignment with us.

You should have already received some information on the Base and the local area. In this regard, let me remind you of the Air Force requirement that you report to the Housing Referral Office in Building 2 prior to making any commitments for housing.

Until you are settled here, you should have all mail forwarded to General Delivery-PSC Wright-Patterson AFB, Ohio 45433. For your convenience I'm including the Billeting Offices's location and number. The Transient Lodging Facility (TLF) is located in Bldg 828, Area A, the office symbol is 2750 ABW/SVHO and the Autovon is 787-3451.

I hope your move will be completed satisfactorily and that you will enjoy your tour with the 2750th Logistics Squadron. Once again welcome.

Sincerely

I M COMMANDING, Captain, USAF
Squadron Section Commander

FIGURE 38.

Computer Prepared Welcome Letter 2

4 Aug 83

[redacted]
51 Twirp Ave
Scott AFB, Il 22331

Dear CMSgt Time

Welcome to Wright-Patterson Air Force Base. I am looking forward to meeting you and having you as a member of the 2750th Logistics Squadron. I believe that you will find your assignment to the Logistics Squadron rewarding for both you and the Air Force Logistics Command.

CMSgt Richard Williams, Supply Branch, telephone (513) 257-7701, GP Autovon 787-7701 has been appointed as your sponsor. Don't hesitate to call on him with problems or questions on your assignment with us.

You should have already received some information on the Base and the local area. In this regard, let me remind you of the Air Force requirement that you report to the Housing Referral Office in Building 2 prior to making any commitments for housing.

Until you are settled here, you should have all mail forwarded to General Delivery-PSC Wright-Patterson AFB, Ohio 45433. For your convenience I'm including the Billeting Offices's location and number. The Transient Lodging Facility (TLF) is located in Bldg 828, Area A, the office symbol is 2750 ABW/SVHO and the Autovon is 787-3451.

I hope your move will be completed satisfactorily and that you will enjoy your tour with the 2750th Logistics Squadron. Once again welcome.

Sincerely

I M COMMANDING, Captain, USAF
Squadron Section Commander

FIGURE 39.

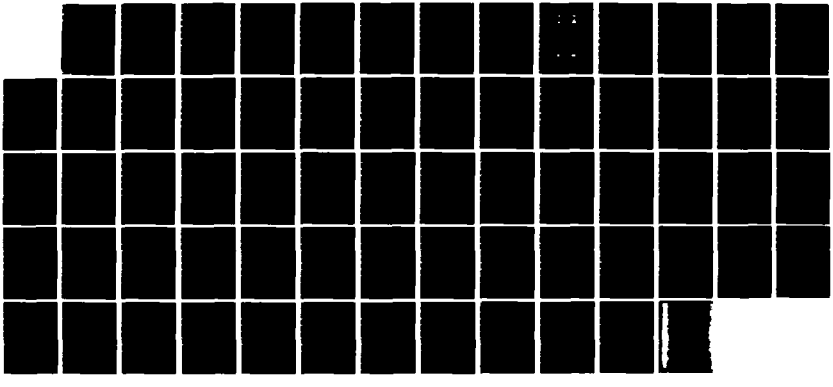
Sample of MailMerge Computer Prepared Welcome Letter 4

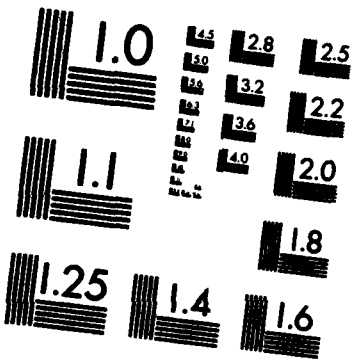
APPENDIX G

PERSONNEL MANAGEMENT/REPORTING

AD-A142 838 SMALL COMPUTER APPLICATIONS FOR BASE SUPPLY(U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND LOGISTICS P M HOWARD MAR 84 3/3

UNCLASSIFIED AFIT-LSSR-116-83 F/G 5/1 NL





PERSONNEL MANAGEMENT/REPORTING

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 6w.

Responsibility: Maintain a current manpower source list or personnel management roster including projected increases and decreases.

Office of Primary Responsibility (OPR): Chief of Supply.

Office of Cursory Responsibility (OCR): Procedures and Standardization Section.

Software: DataStar and ReportStar.

Hardware: Chromemco, System CS-2.

Manual Task Accomplishment Steps:

(1) Personnel monitor receives direction on the information required by the Chief of Supply in monitoring personnel status and the criteria for reporting this information.

(2) Personnel Monitor prepares keypunch cards for each position of Base Supply. Each card contains various pieces of information used to monitor and identify a position. These cards are updated as changes in the information occur (Figure 40). Personnel monitor also prepares keypunch cards to provide statistics on overall manning strengths for each branch (Figure 41). Personnel monitor receives a monthly listing of all keypunch cards prepared. Time Used: 30 minutes monthly, for updating position keypunch cards, based on an estimate for six months of card preparation. 45 minutes monthly, for computation of statistics from keypunch cards, based on an estimate for six months of statistics computations.

Computer Task Accomplishment Steps:

(1) Personnel monitor receives direction on the information required by the the Chief of Supply in monitoring personnel status and the criteria for reporting this information.

(2) Personnel monitor learns procedures for form generation software package. Time Used: a one time requirement of 6 hours, for DataStar and ReportStar.

(3) Personnel monitor creates form input image (Figure 42). Time Used: a one time requirement of 1.5 hours, for DataStar.

(4) Personnel monitor creates a standard report format, "Supply Manning Report." Time used: a one time requirement of .5 hours, for ReportStar.

(5) Personnel monitor inputs data for each position of Base Supply into small computer file (PERSNEL). Personnel monitor processes "Supply Manning Report" at the end of each month for statistics computation. Time used: 15 minutes monthly, for updating PERSNEL file, based on averaging six updates to the file. 10 minutes monthly, for processing report, based on averaging six processings of the report (Figure 43).

Analysis:

(1) Speed:

(a) Manual accomplishment of keypunch card updating was not actually observed. (Personnel monitor estimates that 30 minutes per month is the average time used for task accomplishment (Table 13)). The monthly report is accomplished using the UNIVAC 1050-II and it is estimated that 15 minutes is the average time used for producing the report.

(b) Computerized accomplishment of the monthly update to the small computer file was observed six times, the average time used was 15 minutes. Computerized accomplishment of report preparation (which includes statistics computation) was observed six times, the average time used was ten minutes (Table 13).

(c) Based on the data presented, it appears that the task of updating the position information and computing statistics from the file can be completed more quickly when computerized.

(2) Accuracy:

(a) Manual accuracy for updating the keypunch cards was observed for the monthly report for May 1983, the average number of errors for that month was 18 (Table 14).

(b) Computerized accuracy for updating the position file was observed for the May 1983 computerized report, the average number of errors for that month was zero (Table 14). (NOTE: The report prepared by the computer does provide the information separated by each Functional Area Code (FAC), however, it does not provide the information in the correct sequence within FAC. This is due to the software placing the last update or input at the end of the file. Therefore this report is not a true replacement product for the manual report.)

(c) Based on the data presented, it appears that the number of errors will be decreased when computerized versus manually. However, the report is not a true replacement product for the manual report.

TABLE 13

Updating Personnel Position Information

Method	Time Used, Minutes Per Month					
	Jan	Feb	Mar	Apr	May	Jun
Manually	30*	30*	30*	30*	30	30*
Computerized	15	15	15	15	15	15

TABLE 14

Errors In Preparations

Method	Errors, Number Per Month					
	Jan	Feb	Mar	Apr	May	Jun
Manually	18*	18*	18*	18*	18	18*
Computerized	0	0	0	0	0	0

* Estimated from the Personnel monitor and/or the May 1983 Personnel Report.

Subjective Observations:

(1) Manual Accomplishment:

(a) None.

(2) Computerized Accomplishment:

(a) Because of the software package's placement of inputs and changes to the data file, the computerized report does not meet the needs of the personnel monitor.

ITEM	CARD POSITIONS
Functional Account Code (FAC)	1-4
Position Number	5-10
Duty Title	11-25
Authorized AF Specialty Code (AFSC)	26-30
Authorized Grade	32-34
Assigned AFSC	35-39
Assigned Grade	41-43
Last Name	44-52
First Initial	54
Middle Initial	55
Remarks	57-80

FIGURE 40.

Keypunch Card Format for Personnel Information

ITEM	CARD POSITIONS
Number Required Each FAC	10-12
Number Authorized Each FAC	23-26
Number On/Hand Each FAC	27-39
Number Assigned Each FAC	50-55

FIGURE 41.

Keypunch Card Format for Personnel Statistics

Please enter the information required for these data fields. Whenever you completely fill the alloted spaces, the computer will progress to the next item automatically.

Functional Area Code (5 spaces):
Postion Number (6 spaces):
Duty Title (15 spaces):
Authorized AFSC (6 spaces):
Authorized Grade (4 spaces):
Assigned AFSC (6 spaces):
Assigned Grade (4 spaces):
Last Name (15 spaces):
First Initial (1 space):
Middle Initial (1 space):
Remarks (20 spaces):

FIGURE 42.

Personnel Information Input Screen Format

SUPPLY MANNING REPORT
05/18/83

FAC = 4100

FAC	ORGANIZATION TITLE	OFFICE SYMBOL	TELEPHONE
4100	SUPPLY BRANCH	DMS	76158

			AUTHORIZED		ASSIGNED				
FAC	POS NO	DUTY TITLE	AFSC	GRADE	AFSC	GRADE	TYPE	NAME	REMARKS
4100	[redacted]	CHIEF OF SUPPLY	06416	LTC	06416	MAJ	1	[redacted]	
4100	[redacted]	DEP CHIEF SUPPL	06416	M13	02003	M13	2	[redacted]	
4100	[redacted]	SECTY STENO	70250	G06	00318	G06	2	[redacted]	

Summary for FAC (Count = 3): Required (Count = 3): Authorized (Count = 3): Overhire (Count = 3):

FAC = 4170

FAC	ORGANIZATION TITLE	OFFICE SYMBOL	TELEPHONE
4170	FUELS MGT SECTION	DMSFT	72223

			AUTHORIZED		ASSIGNED				
FAC	POS NO	DUTY TITLE	AFSC	GRADE	AFSC	GRADE	TYPE	NAME	REMARKS
4170	[redacted]	QUAL ASSURE EVL	63170	G09	01960	G09	2	[redacted]	
4170	[redacted]	QUAL ASSURE EVL	63170	G09	01960	G09	2	[redacted]	
4170	[redacted]	QUAL ASSURE EVL	63170	G09	01960	G09	2	[redacted]	
4170	[redacted]	QUAL ASSURE EVL	63170	G09	01960	G09	2	[redacted]	
4170	[redacted]	QUAL ASSURE EVL	63170	G09	01960	G09	2	[redacted]	
4170	000000	QUAL ASSURE EVL	63170	G0Z	01960	G0Z	3		OH
4170	000000	QUAL ASSURE EVL	63170	G0Z	01960	G0Z	3		OH

Summary for FAC (Count = 7): Required (Count = 7): Authorized (Count = 7): Overhire (Count = 7):

FAC = 4120

FIGURE 43. Computer Prepared Personnel Report

APPENDIX H

BUDGET ALLOCATION CHANGES

BUDGET ALLOCATION CHANGES

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 10c(7).

Responsibility: Prepare and manage operating budget for the Chief of Supply responsibility center and cost centers.

Office of Primary Responsibility (OPR): Funds Management Section.

Software: CalcStar.
VISICALC.

Hardware: Chromemco, System CS-2.
Radio Shack, TRS-80 Model III.

Manual Task Accomplishment Steps:

(1) Chief of Supply and Organization Funds Manager establish budget targets for Operations and Maintenance (O&M) dollars for the seven Base Supply Cost Centers.

(2) Organization Funds Manager allocates budget targets for O&M dollars to Cost Center Funds Managers on a quarterly basis, divided into monthly increments. Organization Funds Manger records target data on a columnar form for each Cost Center (Figure 44).

(3) Actual accumulated monthly expenditures of O&M dollars are provided daily on D-11, "PFMR/OCCR Update and Reconciliation" report for each Cost Center. Organization Funds Manager records data on a columnar form for each Cost Center as of the end of the month.

(4) Management analyst prepares slide portraying monthly expenditure data for the current and prior year's for all Base Supply Cost Centers.

(5) Chief of Supply, Organization Funds Manager and Cost Center Funds Managers monitor O&M expenditures and make future allocation decisions aided by processing "what if" situations, such as, budget targets remain the same and expenditures follow the prior year's; budget targets are reduced by 10% and expenditures follow the prior year's; and budget targets remain the same and expenditures increase by 10% over the prior year's. Time used: 180 minutes (3 hours) per "what if" situation, based on an estimate for calculating the three situations.

Computer Task Accomplishment Steps:

(1) Organization Funds Manager learns procedures for the electronic spread-sheet software package. Time used: a one time requirement of 3.5 hours, average for CalcStar or VISICALC.

(2) Organization Funds Manager creates an electronic spread-sheet (Figure 45). Time used: a one time requirement of .5 hours.

(3) Chief of Supply and Organization Funds Manager establish budget targets for Operations and Maintenance (O&M) dollars for the seven Base Supply Cost Centers.

(4) Organization Funds Manager allocates budget targets for O&M dollars to Cost Center Funds Managers on a quarterly basis, divided into monthly increments. Organization Funds Manager enters target data into electronic spread-sheet.

(5) Actual accumulated monthly expenditures of O&M dollars are provided daily on D-11, "PFMR/OCCR Update and Reconciliation" report, for each Cost Center. Organization Funds Manager enters data into electronic spread-sheet. Time Used: 5 minutes per month, based on seven entries each month.

(6) Management analyst prepares slide portraying monthly expenditure data for the current and prior year's for all Base Supply Cost Centers. Time used: 5 minutes, based on averaging six preparations of slides.

(7) Chief of Supply, Organization Funds Manager, and Cost Center Funds Managers monitor O&M expenditures and make future target allocation decisions aided by processing "what if" situations such as, budget targets remain the same and expenditures follow the prior year's; budget targets reduced by 10% and expenditures follow the prior year's; and budget targets remain the same and expenditures increase by 10% over the prior year's. Time used: 10 minutes per situation, based on processing each new situation once.

Analysis:

(1) Speed:

(a) Manual accomplishment of computing a "what if" allocation situation was observed only once, the time used was 180 minutes (3 hours) (Table 15).

(b) Computerized accomplishment of calculations for three different "what if" situations was observed, the average time per situation was 10 minutes (Table 15).

(c) Based on the data presented, it appears that the task of computing allocation situations can be accomplished faster when computerized over the manual method.

(2) Accuracy:

(a) Manual accuracy for the numeric computations necessary for one budget allocation situation was observed once, the number of errors was eleven (Table 16).

(b) Computerized accuracy for numerical computing was observed for the same allocation situation, the number of errors was zero (Table 16).

(c) Based on the data presented, it appears that the number of errors will be fewer when computerized.

TABLE 15

Budget Allocation Change Computation

Method	Time Used, Minutes Per Computation		
	1	2	3
Manually	180*	180*	180
Computerized	10	10	10

* Estimate based on the time required for computation 3.

Computation 1: Budget targets remain the same and expenditures follow the prior year's.
Computation 2: Budget targets reduced by 10% and expenditures follow the prior year's.
Computation 3: Budget targets remain the same and expenditures increase by 10% over the prior year's.

TABLE 16

Errors In Computations

Method	Errors Per Computation		
	1	2	3
Manually	11*	11*	11
Computerized	0	0	0

* Estimate based on errors occurring in computation 3.

Subjective Observations:

(1) Manual Accomplishment:

(a) None.

(2) Computerized Accomplishment:

(a) Both software packages can be directed to provide a copy of the electronic spread-sheet, allowing the Funds Manager to provide professional looking copies of the calculations without having to request typing assistance from a clerk-typist.

Organization Cost Center Record 411
1983

MONTH	TARGET	EXPENDED	OBLIG D/O	REMAINDER	%EXPENDED
JAN	2200.00	1444.44	328.00	755.56	65.65%
FEB	2700.00	1275.86	115.35	1424.14	47.25%
MAR	2700.00	820.33	861.72	1879.67	30.38%
QTR	7600.00	3540.63		4059.37	46.58%
APR	1500.00	621.74	500.25	878.26	41.44%
MAY	1500.00	1245.85	00.00	254.15	83.05%
JUN	1500.00	1332.75	00.00	167.25	88.85%
QTR	4500.00	3200.34		1299.66	71.11%
JUL	1500.00				
AUG	1500.00				
SEP	1500.00				
QTR	4500.00				
OCT	1500.00				
NOV	1500.00				
DEC	1500.00				
QTR	4500.00				
YR	21100.00	6740.97	1805.32	14359.03	31.94%

FIGURE 44.

Manually Prepared Cost Center Data

FIGURE 45.

Computer Prepared Electronic Spread-Sheet Cost Center Data

OCCR 411	jan 83	feb 83	mar 83	apr 83	may 83	jun 83	jul 83	aug 83	sep 83	oct 83	nov 83	dec 83
target	2200.00	2700.00	2700.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00
expended	1444.44	1275.86	820.33	621.74	1245.85	1332.75						
oblig d/o	755.56	115.35	861.72	500.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amt rem	755.56	1424.14	1879.67	878.26	254.15	167.25	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00
% Expended	65.66	47.25	30.38	41.45	83.06	88.85	0.00	0.00	0.00	0.00	0.00	0.00

OCCR 412	jan 83	feb 83	mar 83	apr 83	may 83	jun 83	jul 83	aug 83	sep 83	oct 83	nov 83	dec 83
target	7900.00	8400.00	8400.00	14800.00	14800.00	14800.00	14800.00	14800.00	14800.00	14800.00	14800.00	14800.00
expended	5084.00	6201.55	7907.21	10122.16	11463.36	12833.08						
oblig d/o	326.00	435.22	476.24	476.24	476.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amt rem	2816.00	2198.45	492.79	4677.84	3336.64	1966.92	14800.00	14800.00	14800.00	14800.00	14800.00	14800.00
% Expended	64.35	73.83	94.13	68.39	77.46	86.71	0.00	0.00	0.00	0.00	0.00	0.00

OCCR 413	jan 83	feb 83	mar 83	apr 83	may 83	jun 83	jul 83	aug 83	sep 83	oct 83	nov 83	dec 83
target	1100.00	1600.00	2600.00	5300.00	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00
expended	1178.26	3301.43	3501.39	3667.10	486.17	4222.93						
oblig d/o	755.56	115.35	861.72	500.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amt rem	-78.26	-1701.43	-901.39	1632.90	4513.83	777.07	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00
%Expended	107.11	206.34	134.67	69.19	9.72	84.46	0.00	0.00	0.00	0.00	0.00	0.00

OCCR 414	jan 83	feb 83	mar 83	apr 83	may 83	jun 83	jul 83	aug 83	sep 83	oct 83	nov 83	dec 83
target	2900.00	3400.00	3400.00	3900.00	3900.00	3900.00	3900.00	3900.00	3900.00	3900.00	3900.00	3900.00
expended	2693.16	3014.08	3196.24	3288.35	3438.79	3692.90						
oblig d/o	128.14	385.62	272.86	131.36	131.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amt rem	206.84	385.92	203.76	611.65	461.21	207.10	3900.00	3900.00	3900.00	3900.00	3900.00	3900.00
% Expended	92.87	88.65	94.01	84.32	88.17	94.69	0.00	0.00	0.00	0.00	0.00	0.00

OCCR 415	jan 83	feb 83	mar 83	apr 83	may 83	jun 83	jul 83	aug 83	sep 83	oct 83	nov 83	dec 83
target	4600.00	3100.00	3100.00	5800.00	5800.00	5800.00	5800.00	5800.00	5800.00	5800.00	5800.00	5800.00
expended	3606.19	4008.88	4112.47	4827.03	5412.85	5592.67						
oblig d/o	966.36	1304.26	1431.12	778.12	319.56	267.65	0.00	0.00	0.00	0.00	0.00	0.00
Amt rem	993.81	-908.88	-1012.47	972.97	387.15	207.33	5800.00	5800.00	5800.00	5800.00	5800.00	5800.00
% Expended	78.40	129.32	132.66	83.22	93.33	96.43	0.00	0.00	0.00	0.00	0.00	0.00

OCCR 416	jan 83	feb 83	mar 83	apr 83	may 83	jun 83	jul 83	aug 83	sep 83	oct 83	nov 83	dec 83
target	13200.00	14700.00	14700.00	18700.00	18700.00	18700.00	18700.00	18700.00	18700.00	18700.00	18700.00	18700.00
expended	12247.68	12711.32	12851.23	18362.45	18674.16	18994.56						
oblig d/o	196.02	142.82	149.82	133.59	0.00	593.41	0.00	0.00	0.00	0.00	0.00	0.00
Amt rem	952.32	1988.68	-1848.77	337.55	25.84	-294.56	18700.00	18700.00	18700.00	18700.00	18700.00	18700.00
% Expended	92.79	86.47	87.42	98.19	99.86	101.58	0.00	0.00	0.00	0.00	0.00	0.00

OCCR 417	jan 83	feb 83	mar 83	apr 83	may 83	jun 83	jul 83	aug 83	sep 83	oct 83	nov 83	dec 83
target	27100.00	28100.00	28100.00	40100.00	40100.00	40100.00	40100.00	40100.00	40100.00	40100.00	40100.00	40100.00
expended	19279.85	24544.18	28935.65	33137.68	36394.82	40394.83						
oblig d/o	1424.74	1818.03	795.54	922.39	1505.07	1494.12	0.00	0.00	0.00	0.00	0.00	0.00
Amt rem	7820.15	3555.82	-835.65	6962.32	3705.18	-294.83	40100.00	40100.00	40100.00	40100.00	40100.00	40100.00
% Expended	71.14	87.35	102.97	82.64	90.76	100.74	0.00	0.00	0.00	0.00	0.00	0.00

OCCR 411	fst qtr	scd qtr	thd qtr	frth qtr	year total	monthly ave
target	7600.00	4500.00	4500.00	4500.00	21100.00	1758.33
expended	3540.63	3200.34	0.00	0.00	6740.97	1123.50
oblig d/o	1732.63	500.25	0.00	0.00	2232.88	186.07
Amt rem	4059.37	1299.66	4500.00	4500.00	14359.03	1196.59
% Expended	46.59	71.12	0.00	0.00	31.95	29.72

OCCR 412	fst qtr	scd qtr	thd qtr	frth qtr	year total	monthly ave
target	24700.00	44400.00	44400.00	44400.00	157900.00	13158.33
expended	19192.76	34418.60	0.00	0.00	53611.36	8935.23
oblig d/o	1237.46	952.94	0.00	0.00	2190.40	182.53
Amt rem	5507.24	9981.40	44400.00	44400.00	104288.64	8690.72
% Expended	77.70	77.52	0.00	0.00	33.95	67.91

OCCR 413	fst qtr	scd qtr	thd qtr	frth qtr	year total	monthly ave
target	5300.00	15300.00	15000.00	15000.00	50600.00	4216.67
expended	7981.08	8376.20	0.00	0.00	16357.28	2726.21
oblig d/o	1732.63	500.25	0.00	0.00	2232.88	186.07
Amt rem	-2681.08	6923.80	15000.00	15000.00	34242.72	2853.56
%Expended	150.59	54.75	0.00	0.00	32.33	64.65

OCCR 414	fst qtr	scd qtr	thd qtr	frth qtr	year total	monthly ave
target	9700.00	11700.00	11700.00	11700.00	44800.00	3733.33
expended	8903.48	10420.04	0.00	0.00	19323.52	3220.59
oblig d/o	786.62	262.72	0.00	0.00	1049.34	87.45
Amt rem	796.52	1279.96	11700.00	11700.00	25476.48	2123.04
% Expended	91.79	89.06	0.00	0.00	43.13	86.27

OCCR 415	fst qtr	scd qtr	thd qtr	frth qtr	year total	monthly ave
target	10800.00	17400.00	17400.00	17400.00	63000.00	5250.00
expended	11727.54	15832.55	0.00	0.00	27560.09	4593.35
oblig d/o	3701.74	1365.33	0.00	0.00	5067.07	422.26
Amt rem	-927.54	1567.45	17400.00	17400.00	35439.91	2953.33
% Expended	108.59	90.99	0.00	0.00	43.75	87.49

OCCR 416	fst qtr	scd qtr	thd qtr	frth qtr	year total	monthly ave
target	42600.00	56100.00	56100.00	56100.00	210900.00	17575.00
expended	37810.23	56031.17	0.00	0.00	93841.40	15640.23
oblig d/o	488.66	727.00	0.00	0.00	1215.66	101.31
Amt rem	4789.77	68.83	56100.00	56100.00	117058.60	9754.88
% Expended	88.76	99.88	0.00	0.00	44.50	88.99

OCCR 417	fst qtr	scd qtr	thd qtr	frth qtr	year total	monthly ave
target	83300.00	120300.00	120300.00	120300.00	444200.00	37016.67
expended	72759.68	109927.33	0.00	0.00	182687.01	30447.84
oblig d/o	4038.31	3921.58	0.00	0.00	7959.89	663.32
Amt rem	10540.32	10372.67	120300.00	120300.00	261512.99	21792.75
% Expended	87.35	91.38	0.00	0.00	41.13	82.25

FIGURE 45 (Continued).

APPENDIX I

MANAGEMENT ANALYSIS CHART PREPARATION

MANAGEMENT ANALYSIS CHART PREPARATION

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec G, 68b(1)(c).

Responsibility: Prepare charts or graphs displaying the account's performance for presentation to the supply management staff at periodic "How Goes It" meetings.

Office of Primary Responsibility (OPR): Management Analysis Section.

Software: VISICALC and DATAGRAPH.

Hardware: Radio Shack, TRS-80 Model III.

Manual Task Accomplishment Steps:

(1) Management analyst prepares "master" chart/graph (which has standard dimensions and dividing lines) for presenting data, using x and y coordinates.

(2) Management analyst computes statistics from data available, as portrayed in Appendices A, B, and H.

(3) Management analyst establishes x and y coordinate values based on statistics, determines chart identification information, types information onto a copy of the "master" chart/graph, and prepares an overhead projector viewgraph.

(4) Management analyst plots statistics onto viewgraph and connects lines.

Computer Task Accomplishment Steps:

(1) Management analyst learns procedure for electronic spread-sheet software package. Time used: a one time requirement of 5 hours, for VISICALC.

(2) Management analyst creates electronic spread-sheet for each graph prepared, or utilizes spread-sheets prepared for other purposes, such as Appendices A, B, and H. Management analyst enters data into electronic spread-sheet. Time used: a one time requirement of .5 hours, for VISICALC.

(3) Management analyst learns procedures for graphics software package. Time used: a one time requirement of 4 hours, for DATAGRAPH.

(4) Management analyst establishes "master" chart/ graph criteria (standard dimensions and number of dividing lines) for presenting data, using x and y coordinates, pie chart size, and bar chart size.

(5) Management analyst enters graphics control criteria for each chart into small computer.

(6) Management analyst directs computer to graph data, examples are provided by Figures 46, 47, 48, and 49.

Subjective Observations:

(1) Manual Accomplishment:

(a) The viewgraphs are created based on the initial set of statistics. Often the data exceeds the initial creation and exceeds beyond the boundaries of the viewgraph. Equally degrading the information presentation is if the initial parameters were too large and changes in the data is not discernable.

(b) Although pie charts present a large amount of information quickly, they are seldom prepared manually due to the time required to create them.

(2) Computerized Accomplishment:

(a) Because of the relatively short time to "re-create" a viewgraph, data does not need to exceed the boundaries of the viewgraph.

(b) Pie charts can be utilized to present the same data in a different manner with little effort. The information presented provides an easier method of absorbing some information, i.e., CLO Call-Ins (Figure 49).

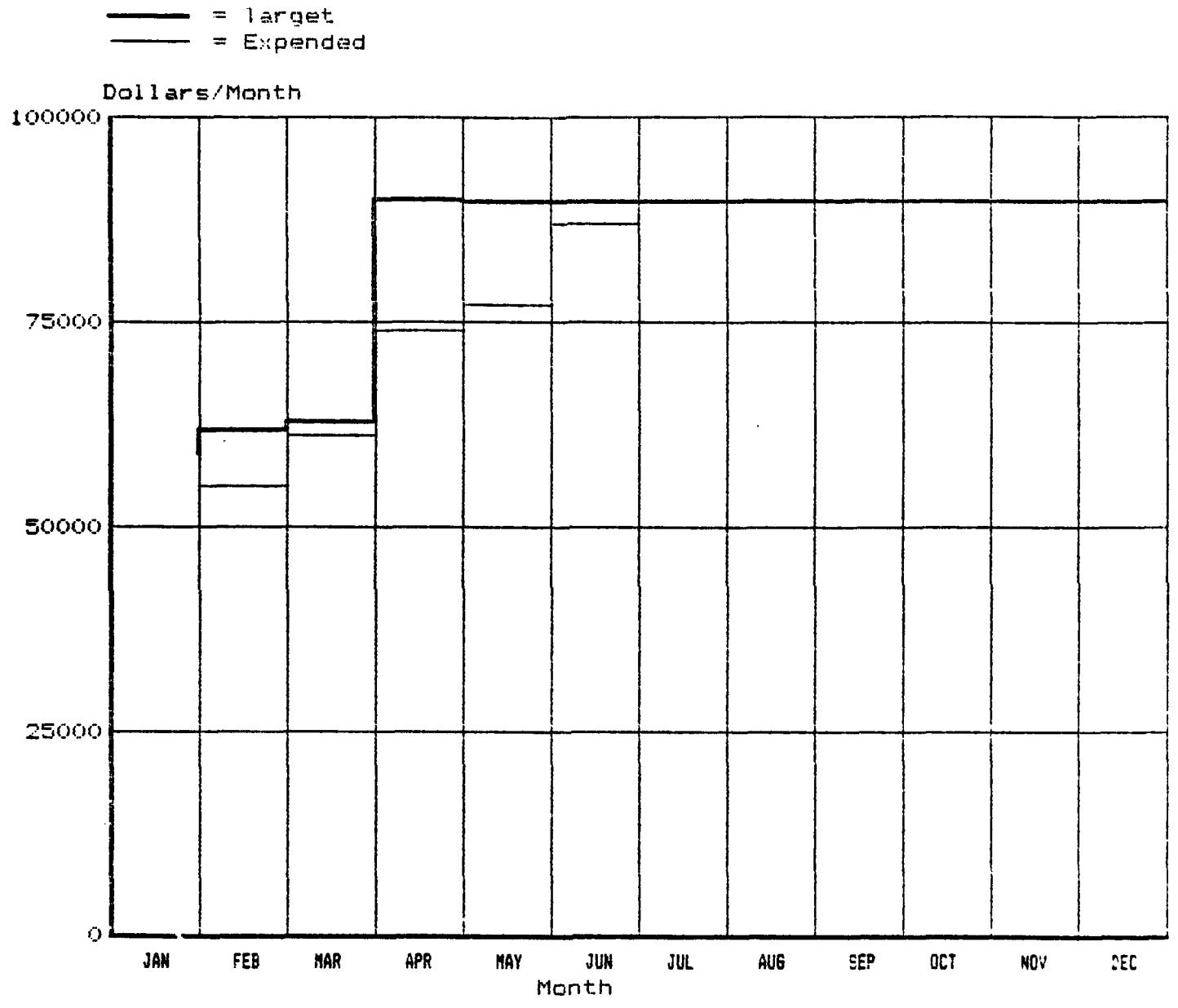


FIGURE 46.

Computer Prepared X-Y Chart for Expenditure Data 5"x7"

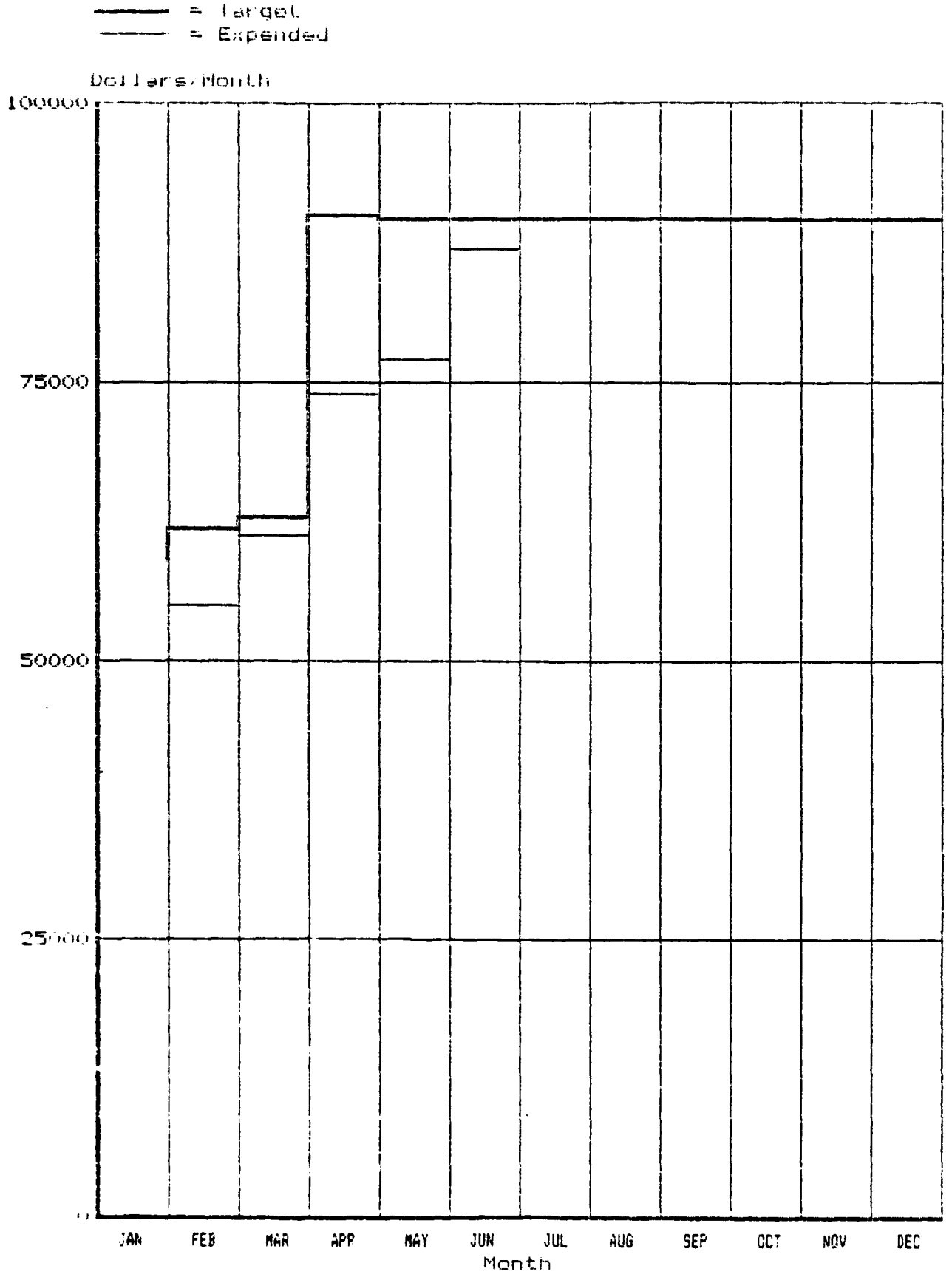


FIGURE 47.

Computer Prepared X-Y Chart for Expenditure Data 8"x6"

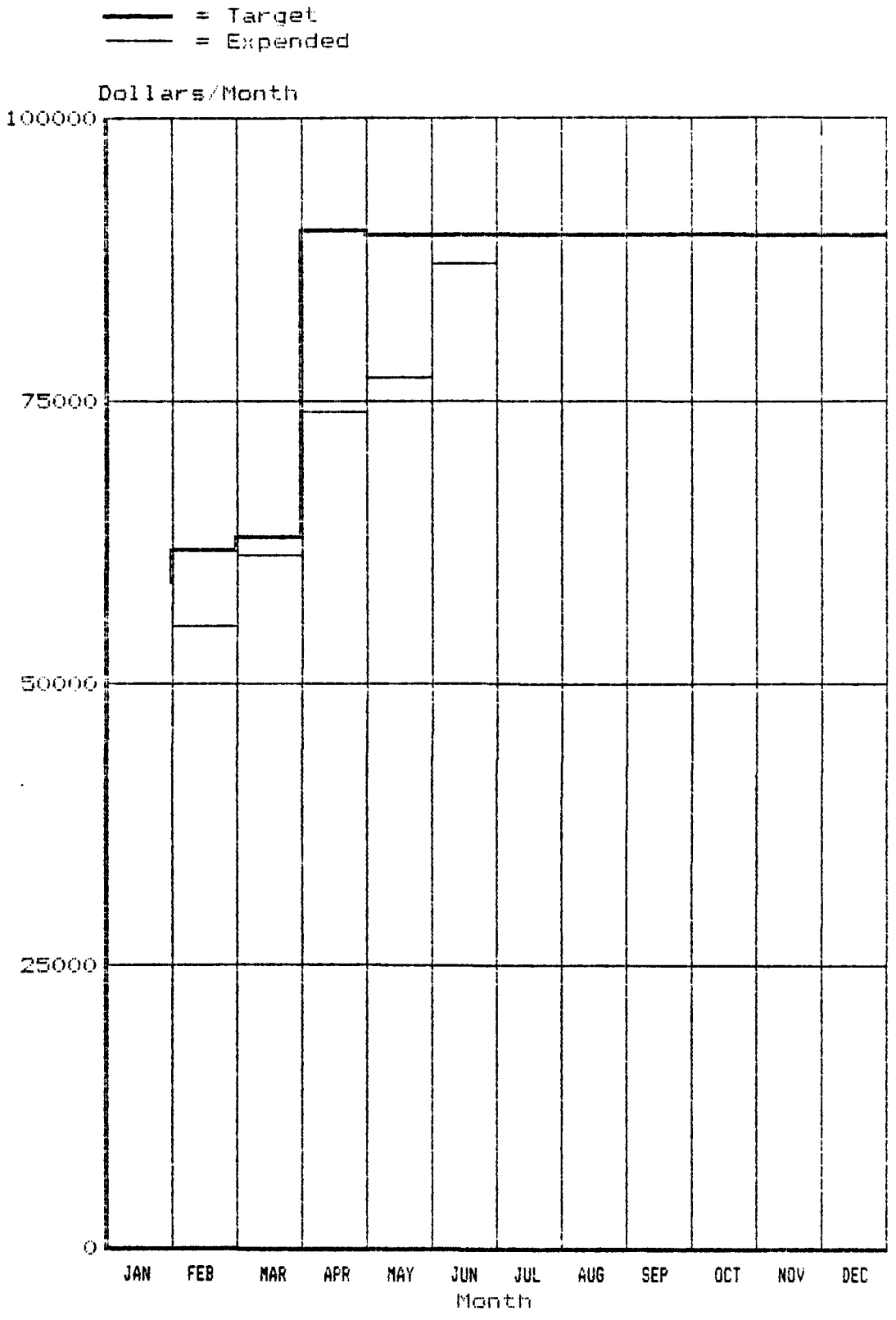


FIGURE 48.

Computer Prepared X-Y Chart for Expenditure Data 7"x5"

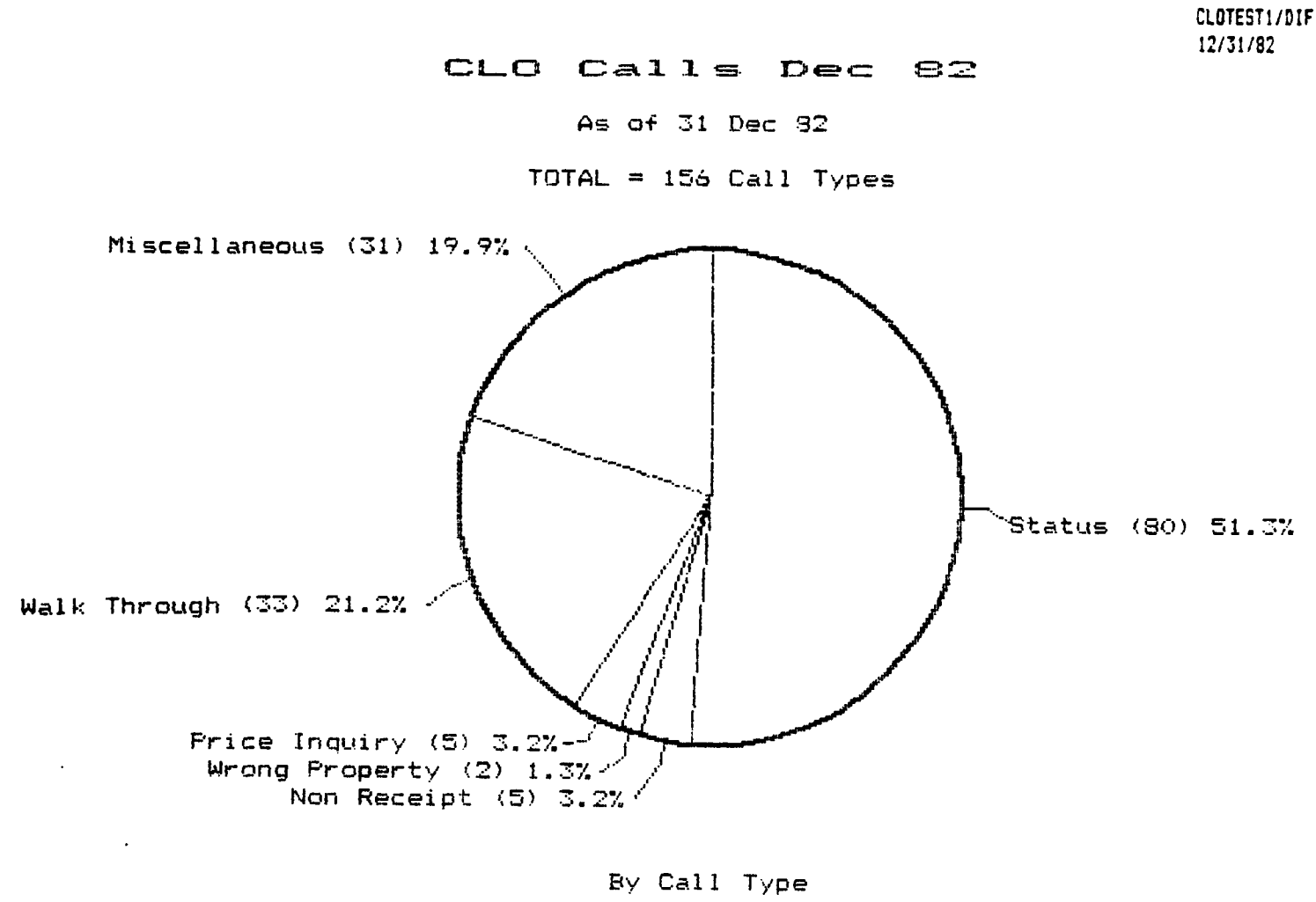


FIGURE 49.

Computer Prepared Pie Chart for December CLO Call-Ins

APPENDIX J

EQUIPMENT TRAINING

EQUIPMENT TRAINING

Reference: AFM 67-1, Vol II, Pt Two, Ch 2, Sec B, 10a(6).

Responsibility: Provide Base Supply customer training according to AFR 50-10.

Office of Primary Responsibility (OPR): Training Section.

Software: Author I.

Hardware: Radio Shack, TRS-80 Model III.

Manual Task Accomplishment Steps:

(1) Trainer establishes equipment custodian training package (Figure 50) to meet local needs and requirements.

(2) Organization Commander assigns individuals as equipment custodians at least 30 days in advance of becoming custodians.

(3) Trainer schedules new equipment custodian for training. Trainer must accomplish equipment custodian training and administer a test (Figure 51), prior to the new custodian accepting responsibility for the equipment account.

Computerized Task Accomplishment:

(1) Trainer learns procedures for Computer-Based Education software package. Time used: a one time requirement of 4 hours, for Author I.

(2) Trainer establishes equipment custodian training package to meet local needs and requirements.

(3) Trainer enters instructional packages and test(s) into small computer. Time used: a one time requirement of 1 hour, based on information shown in Figures 52 and 53.

(4) Organization Commander assigns individuals as equipment custodians at least 30 days in advance of becoming custodians.

(5) Trainer schedules new equipment custodian for training. Trainer must accomplish equipment custodian training (through Computer-Assisted or Computer-Managed Instruction or classroom training) and administer a test (through computer proctoring or traditional method), prior to the new custodian accepting responsibility for the equipment account.

Subjective Observations:

(1) Manual Accomplishment:

(a) All too often organization commanders cannot appoint new custodians 30 days in advance, thus compressing the time available for training. This sometimes results in the trainer accomplishing training for one new equipment custodian, and proctoring the test.

(2) Computerized Accomplishment:

(a) By having the equipment custodian training package and test on the small computer, the trainer does not necessarily have to provide individualized training when the situation cited above occurs.

(b) When the trainer is not able to teach a class, the entire set of students must be rescheduled, often times causing inconvenience to the students and requiring changes to their work schedule. By utilizing the small computer, these students could be rescheduled to match their schedule, rather than the trainer's.

(c) Because of the word-processing capabilities of the Author I package, whenever changes need to be made to the text of the training package these changes can be made quickly and easily, saving the trainer many man-hours. Also, if changes are required to a question or the content of the test, these changes can be made quickly and easily.

RESPONSIBILITY FOR PUBLIC PROPERTY
IN POSSESSION OF THE AIR FORCE
(AFR 67-10)

1. Property responsibility is imposed by law on all officers, airmen, and civilians; it cannot be delegated. Such responsibility is the obligation of the individual, regardless of duty assignment, at all levels of command. Individuals may be charged with one or more of the three categories of responsibilities which are: Command Responsibility, Supervisory Responsibility and Custodial Responsibility.

a. Command Responsibility. Commanders at all echelons are charged with Command responsibility for all property in use or in storage at installations and activities under their jurisdiction. They are not exempt from pecuniary liability for loss, damage or destruction of Government property pertaining to their command. Commanders will insure that qualified accountable officers, airmen, and civilians are selected and assigned, that prescribed property records of transactions are accurately maintained and currently reflect the status of the property charged to these accounts and that diligence is exercised over economical use, care, custody and safeguarding of property. Commanders will also insure that adequate storage space is provided and that all personnel referred to in this regulation are instructed and indoctrinated in their general and specific responsibilities toward property.

b. Supervisory responsibility applies to any person who exercises supervision over property received, in use, in storage, or undergoing modification or repair. The responsibility includes the selection of qualified personnel who will perform duties under his control, properly directing or training such personnel, issuing instructions to these personnel to insure compliance with Air Force regulations governing property and indoctrinating all concerned in principles of supply discipline.

c. Custodial responsibility is vested in an individual who has acquired possession of Government property. He is personally responsible for such property if it is: issued for his official or personal use, whether or not he has signed a receipt for it, under his direct control for storage, use, custody, or safeguarding, found indicating possible loss, theft or abandonment under circumstances requiring his personal care, custody, or protection.

2. Personnel having responsibility also have pecuniary liability to make good the loss, destruction or damage of property caused by their maladministration or negligence in the use, care, custody, or safeguarding of such property from causes other than fair wear and tear. If willful unauthorized issues of property are made and the property is lost, destroyed, or damaged, the person issuing and the person receiving the property will be held jointly and separately liable for the value of the property. Pecuniary liability may be shared in any particular case by persons having command, supervisory and custodian responsibility.

FIGURE 50.

Sample Page of Equipment Custodian Training Package

DO NOT MARK IN THIS BOOKLET

OPEN BOOK TEST BLOCK III - EQUIPMENT MANAGEMENT
(IAW AFM 67-1, Vol II, Part Two, Chap II, WP Sup 1)
USE AFR 67-23

1. Procedures in AFR 67-23 were taken from AFM 67-1. In case of a conflict, AFM 67-1 applies; however, you should report any conflicts to AFDSDC/LGS.

a. True
b. False

2. For an organization or activity to get logistics support from Base Supply, the organization commander must write a letter, asking for an account to be established.

a. True
b. False

3. Who is responsible for appointing property custodians and alternates?

a. Chief of Supply
b. Base Commander
c. Chief of Maintenance
d. Organization Commander

4. What is used as a control or reference number to identify an individual or a specific transaction within Supply?

a. Requisition number
b. Document number
c. Custodian request number
d. Shipping number

5. What activity code is used for issues/turn-ins of non-EAID equipment items?

a. E
b. R
c. B
d. P

6. The Document Register gives a record of each document number used by an organization, identifies the shop but does not show the action taken on the request.

a. True
b. False

7. The activity code identifies the method or location used by an organization to place an issue or turn-in request to Base Supply.

a. True
b. False

8. What would be your requisition priority, if your FAD was 4 and the urgency of need designator was B?

a. 5
b. 6
c. 9
d. 10

FIGURE 51.

Sample Page of Equipment Custodian Test

RADIO SHACK TRS-80 AUTHOR I Lesson: AF6710
Version: 06/25/83 Page: 01 of 10 Page type: TEXT

```
!     .This is a lesson providing the responsibility of          !
!     .individuals in the Air Force, as prescribed in            !
!     .Air Force Regulation 67-10.                               !
!     .                                                          !
!     .                                                          !
!     .                                                          !
!     .                                                          !
!     .                                                          !
!     .                                                          !
!     .                                                          !
!     .                                                          !
!     .                                                          !
!     .                                                          !
```

FIGURE 52.

Computer Prepared Equipment Custodian Training Package

```
 RADIO SHACK  TRS-80 AUTHOR I      Lesson: AF6710
Version: 06/25/83        Page: 02 of 10    Page type: TEXT

-------------------------------------------------------------
!     .1.  Property responsibility is imposed by law on all  !
!     .officers, airmen, and civilians; it cannot be delegated.  !
!     .Such responsibility is the obligation of the individual,  !
!     .regardless of duty assignment, at all levels of command.  !
!     .Individuals may be charged with one or more of the three  !
!     .categories of responsibilities which are Command Respons- !
!     .ibility, Supervisory Responsibility and Custodial Respons- !
!     .ibility.                                               !
!     .                                                       !
!     .                                                       !
!     .                                                       !
!     .                                                       !
!     .                                                       !
-------------------------------------------------------------
```

FIGURE 52 (Continued).

RADIO SHACK TRS-80 AUTHOR I Lesson: AF6710
Version: 06/25/83 Page: 03 of 10 Page type: TEXT

```
!    .a. Command Responsibility.  Commanders at all echelons are !
!    .charged with command responsibility for all properyt in use!
!    .or in storage at installations and activities under their  !
!    .jurisdiction.  They are not exempt from pecuniary loss,    !
!    .damage or destruction of Government property pertaining to !
!    .their command.  Commanders will insure that qualified acc- !
!    .ountable officers, airmen, and civilians are selected and  !
!    .assigned, that prescribed property records of transactions !
!    .are accurately maintained and currently relect the status  !
!    .of the property charged to these accounts and that dili-   !
!    .gence is exercised over economical use, care custody and   !
!    .safeguarding of property.                                  !
!    .                                                           !
```

FIGURE 52 (Continued).

```
!    .b.  Supervisory responsibility applies to any person who    !
!    .exercises supervision over property received, in-use, in    !
!    .storage, or undergoing modification or repair.  The respon-!
!    .sibility includes the selection of qualified personnel who  !
!    .will perform duties under his control, properly directing   !
!    .or training such personnel, issuing instructions to these   !
!    .personnel to insure compliance with Air Force regulations   !
!    .governing property and indoctrinating all concerned in      !
!    .principles of supply discipline.                            !
!    .                                                            !
!    .                                                            !
!    .                                                            !
!    .                                                            !
```

FIGURE 52 (Continued).

RADIO SHACK TRS-80 AUTHOR I Lesson: AF6710
Version: 06/25/83 Page: 05 of 10 Page type: TEXT

```
!    .c.  Custodial responsibility is vested in an individual    !
!    .who has acquired possession of Government property.  He is !
!    .personally responsible for such property if it is: issued  !
!    .for his official or personal use, whether or not he has    !
!    .signed a receipt for it, under his direct control for stor-!
!    .age, use, custody, or safeguarding, found indicating pos-  !
!    .sible loss, theft or abandonment under circumstances re-   !
!    .quiring his personal care, custody, or protection.         !
!    .                                                           !
!    .                                                           !
!    .                                                           !
!    .                                                           !
!    .                                                           !
```

FIGURE 52 (Continued).

```
 RADIO SHACK  TRS-80 AUTHOR I      Lesson: AF6710
Version: 06/25/83         Page: 06 of 10    Page type: TEXT

---------------------------------------------------------------
!     .Question:  There are how many categories of responsi-    !
!     .bilities?                                                !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .               One      Five      Three                  !
---------------------------------------------------------------
```

FIGURE 52 (Continued).

```
 RADIO SHACK  TRS-80 AUTHOR I      Lesson: AF6710
Version: 06/25/83        Page: 07 of 10   Page type: QUESTION

|-------------------------------------------------------------------|
!                                                                   !
!                                                                   !
!                                                                   !
!                                                                   !
!                   One      Five      Three                      !
!ANSWER:                                                           !
!Three                                                            .!
!           Mark here for single keystroke response:  .             !
!MAX. TRIES: 01. WEIGHT: 10. GROUP:        . ANSWER LABEL:        .!
!POSITIVE MESSAGE: Very good. Please proceed.                     .!
!                                                                 .!
!NEGATIVE MESSAGE: Please re-read the first section.              .!
!                                                                 .!
|-------------------------------------------------------------------|
|-------------------------------------------------------------------|
!                            TRIES HINT                             !
!Appear after how many tries:    .                                 !
!HINT:                                                            .!
!                         TRIGGERED HINTS                         !
!Triggers:                                                        .!
!HINT:                                                            .!
!Triggers:                                                        .!
!HINT:                                                            .!
!Triggers:                                                        .!
!HINT:                                                            .!
!Triggers:                                                        .!
!HINT:                                                            .!
!                                                                   !
|-------------------------------------------------------------------|
```

FIGURE 52 (Continued).

```
 RADIO SHACK  TRS-80 AUTHOR I      Lesson: AF6710
Version: 06/25/83        Page: 08 of 10    Page type: TEXT

---------------------------------------------------------------
!     .Question:  Must a person with custodial responsibility   !
!     .have signed a receipt to be responsible for Government   !
!     .property which is issued for his official use?           !
!     .                                                         !
!     .a.  Yes                                                  !
!     .                                                         !
!     .b.  No                                                   !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .                                                         !
!     .Please enter your response here:                         !
---------------------------------------------------------------
```

FIGURE 52 (Continued).

```
 RADIO SHACK TRS-80 AUTHOR I      Lesson: AP671A
Version: 06/25/83        Page: 09 of 20   Page type: QUESTION

+-------------------------------------------------------------+
!                                                             !
!                                                             !
!                                                             !
!                                                             !
!     Please enter your response here:                        !
!ANSWER:                                                      !
!                                                            .!
!           Mark here for single keystroke response: N.       !
!MAX. TRIES: 01. WEIGHT: 10. GROUP:        . ANSWER LABEL:   .!
!POSITIVE MESSAGE:                                           .!
!                                                            .!
!NEGATIVE MESSAGE:                                           .!
!                                                            .!
+-------------------------------------------------------------+
+-------------------------------------------------------------+
!                          TRIES HINT                         !
!Appear after how many tries:    .                           !
!HINT:                                                       .!
!                       TRIGGERED HINTS                       !
!Triggers:                                                   .!
!HINT:                                                       .!
!Triggers:                                                   .!
!HINT:                                                       .!
!Triggers:                                                   .!
!HINT:                                                       .!
!Triggers:                                                   .!
!HINT:                                                       .!
!                                                             !
+-------------------------------------------------------------+
```

FIGURE 52 (Continued).

RADIO SHACK TRS-80 AUTHOR I Lesson: AF6710
Version: 06/25/83 Page: 10 of 10 Page type: TEXT

```
!    .2.  Personnel having responsibility also have pecuniary    !
!    .liability to make good the loss, destruction or damage of  !
!    .property caused by their maladministration or negligence   !
!    .in the use, care, custody, or safeguarding of such property!
!    .from causes other than fair wear and tear.  If willful un- !
!    .authorized issues of property are made and the property is !
!    .lost, destroyed, or damaged, the person issuing and the    !
!    .person receiving the property will be held jointly and sep-!
!    .eratelyliable for the value of the property.  Pecuniary    !
!    .liability may be shared in any particular case by persons  !
!    .having command, supervisory and custodial responsibility.  !
!    .                                                           !
!    .                                                           !
```

FIGURE 52 (Continued).

RADIO SHACK TRS-80 AUTHOR I Lesson: EMOQS
Version: 09/30/83 Page: 01 of 17 Page type: TEXT

```
!    .Hello.  Welcome to this computer proctored test on          !
!    .Equipment Custodian procedures.  You will be allowed        !
!    .as long as you want to take the test.  Please take your     !
!    .time!  If there is anything of importance, or which may     !
!    .be misread, the computer will display a ... symbol.         !
!    .Please take note of the word following it!                  !
!    .                                                            !
!    .At the end of the test, the computer will tell you the      !
!    .score you achieved.  Good Luck!.                            !
!    .                                                            !
!    .                                                            !
!    .                                                            !
!    .                                                            !
```

FIGURE 53.

Sample Pages of Computer Prepared Equipment Custodian Test

```
!    .1.  Procedures in AFR 67-23 were taken from AFM 67-1.  In  !
!    .case of a conflict, AFM 67-1 applies; however, you should  !
!    .report any conflicts to AFDSDC/LGS.                        !
!    .                                                           !
!    .     a.  True                                              !
!    .     b.  False                                             !
!    .                                                           !
!    .                                                           !
!    .                                                           !
!    .                                                           !
!    .                                                           !
!    .                                                           !
!    .                                                           !
!    .Type the letter of your answer:>                           !
```

FIGURE 53 (Continued).

```
 RADIO SHACK  TRS-80 AUTHOR I      Lesson: EMOQS
Version: 09/30/83        Page: 03 of 17   Page type: QUESTION

-----------------------------------------------------------------
!                                                               !
!                                                               !
!                                                               !
!                                                               !
!     Type the letter of your answer:>                          !
!ANSWER:                                                        !
!a                                                             .!
!           Mark here for single keystroke response: x.         !
!MAX. TRIES: 02. WEIGHT: 02. GROUP:        . ANSWER LABEL:     .!
!POSITIVE MESSAGE: Correct.                                    .!
!                                                              .!
!NEGATIVE MESSAGE: Sorry, that answer is incorrect.            .!
!                                                              .!
-----------------------------------------------------------------
-----------------------------------------------------------------
!                          TRIES HINT                           !
!Appear after how many tries:    .                             !
!HINT:                                                         .!
!                        TRIGGERED HINTS                       !
!Triggers: b                                                   .!
!HINT: AFR 67-1 is the basis for AFR 67-23 and does supercede. .!
!Triggers:                                                     .!
!HINT:                                                         .!
!Triggers:                                                     .!
!HINT:                                                         .!
!Triggers:                                                     .!
!HINT:                                                         .!
!                                                              !
-----------------------------------------------------------------
```

FIGURE 53 (Continued).

```
 RADIO SHACK  TRS-80 AUTHOR I      Lesson: EMOQS
Version: 09/30/83        Page: 06 of 17    Page type: TEXT

---------------------------------------------------------------
!     .3.  Who is responsible for appointing property custodians  !
!     .and alternatives?                                          !
!     .                                                           !
!     .      a.  Chief of Supply.                                 !
!     .      b.  Base Commander.                                  !
!     .      c.  Chief of Maintenance.                            !
!     .      d.  Organization Commander.                          !
!     .                                                           !
!     .                                                           !
!     .                                                           !
!     .                                                           !
!     .                                                           !
!     .Type the letter of your answer:>                           !
---------------------------------------------------------------
```

FIGURE 53 (Continued).

```
 RADIO SHACK TRS-80 AUTHOR I      Lesson: EMOQS
Version: 09/30/83        Page: 07 of 17   Page type: QUESTION

--------------------------------------------------------------------
!                                                                  !
!                                                                  !
!                                                                  !
!                                                                  !
!     Type the letter of your answer:>                             !
!ANSWER:                                                          !
!d                                                                .!
!           Mark here for single keystroke response: x.            !
!MAX. TRIES: 04. WEIGHT: 02. GROUP:        . ANSWER LABEL:       .!
!POSITIVE MESSAGE: Correct.                                       .!
!                                                                 .!
!NEGATIVE MESSAGE: Sorry.  That is incorrect.                     .!
!                                                                 .!
--------------------------------------------------------------------
--------------------------------------------------------------------
!                          TRIES HINT                              !
!Appear after how many tries:    .                                !
!HINT:                                                            .!
!                        TRIGGERED HINTS                          !
!Triggers: a                                                      .!
!HINT: He is responsible for support.                             .!
!Triggers: b                                                      .!
!HINT: He is not the "organization commander."                    .!
!Triggers: c                                                      .!
!HINT: He is not the "organization commander."                    .!
!Triggers:                                                        .!
!HINT:                                                            .!
!                                                                  !
--------------------------------------------------------------------
```

FIGURE 53 (Continued).

APPENDIX K

GLOSSARY

ALPHANUMERIC: Fields containing both alphabetic and numeric characters (64:754).

BASIC: Beginners All-purpose Symbolic Instruction Code. An easy-to-learn and easy-to-use programming language developed at Dartmouth College. BASIC can be used to solve business problems as well as scientific applications (64:755).

BINARY: (1) A condition or situation having only two possibilities. (2) A number representation system with a two character (64:756).

BINARY DIGIT: In binary notation, either of the digits 0 or 1 (64:756).

BIT: An abbreviation of binary digit (64:756).

BYTE: A grouping of adjacent binary digits operated on by the computer as a unit. The most common size of byte contains eight binary digits (64:757).

CARD COLUMN: One of the vertical lines of punching positions on a punched card (64:757).

CARD INPUT FIELD: A fixed number of consecutive card columns assigned to a unit of information (64:757).

CENTRAL PROCESSING UNIT: That portion of the hardware of a computing system containing the control unit, arithmetic/logic unit, and internal storage unit. Abbreviated CPU (64:757).

CHIP: A small integrated circuit package containing many

logic elements. A small piece of silicon impregnated with impurities in a pattern to form transistors, diodes, and resistors. Electrical paths are formed on it by depositing thin layers of aluminum or gold (64:758).

COLUMN: (1) The vertical members of one line of an array. (2) One of the vertical lines of punching positions on a punched card. (3) A position of information in a computer word (64:758).

COMMERCIAL SOFTWARE: Computer programs that are available, off-the-self, to do specific operations or groups of operations with no user development (54:9).

COMPATIBLE: A term applied to a computer system that implies that it is capable of handling both data and programs devised for some other type of computer system (64:758).

COMPUTER: A calculating device that processes data represented by a combination of discrete data (in digital computers) or continuous data (in analog computers) (64:759).

COMPUTER NETWORK: A complex consisting of two or more interconnected computer systems (64:759).

COMPUTER SYSTEM: A central processing unit together with one or more peripheral devices (64:759).

CP/M: Control Program for Microcomputers developed by Digital Research which has become a defacto standard operating system for small computers (54:9).

CONTROL UNIT: The portion of the central processing unit that directs the step-by-step operation of the entire computing system (64:759).

CURSOR: A movable symbol or spot of light on a video terminal that indicates where the next character will appear or where data are to be entered (64:760).

DATA: Representations of facts or concepts in a formalized manner suitable for communication, interpretation, or processing by people or by automatic means (64:760).

DATA BASE: A comprehensive data file containing information in a format applicable to a user's needs and available when needed (64:760).

DISKETTE: See Floppy disk.

DOWN TIME: A time period during which the computer system is malfunctioning (64:762).

EDIT: To rearrange data or information. Editing may involve the deletion of unwanted data, the selection of pertinent data, the application of format techniques, the insertion of symbols (such as page numbers and typewriter characters), the application of standard processes (such as zero suppression), and the testing of data for reasonableness and proper range (64:762).

FIELD: A column or group of columns in a punch card allocated for punching a particular category of data (64:763).

FILE: An organized collection of related data. For

example, the entire set of inventory master data records made up the Inventory Master File (64:764).

FILE MAINTENANCE: The activity of keeping a file up to date by adding, changing, or deleting data (64:764).

FIRST-GENERATION COMPUTERS: A class of computers that utilized vacuum tubes in their electronic circuitry (64:764).

FLOPPY DISK: A flexible disk (diskette) of oxide-coated mylar that is stored in a paper or plastic envelope. The entire envelope is inserted in the disk unit. Floppy disks are a low-cost storage that is used widely with minicomputers, microcomputers, small business systems, and microprocessor-controlled office machines (64:764).

FOURTH-GENERATION COMPUTERS: Modern computers that use large-scale integration (LSI) or very-large-scale (VLSI) circuitry (64:764).

GENERAL PURPOSE COMPUTER: A computer that is designed to solve a wide class of problems. The majority of digital computers are of this type (64:764).

HARD COPY: A printed copy of computer output, for example, printed reports, listings, or documents (64:765).

HARDWARE: The physical equipment in a computer system, for example, mechanical, electrical, or magnetic devices. Contrasted with software (64:765).

INFORMATION: Data that have been organized into a meaningful sequence (64:766).

INFORMATION RETRIEVAL: A technique of classifying and indexing useful data in mass-storage devices, in a format amenable to interaction with the user(s) (64:766).

INPUT/OUTPUT: A general term for the peripheral devices used to communicate with a digital computer and the data involved in the communication (64:766).

INTEGRATED CIRCUIT: A microminiature electronic circuit produced on a single crystal of silicon (64:766).

INTELLIGENT TERMINAL: An input/output device in which a number of computer processing characteristics are physically built into, or attached to, the terminal unit (64:766).

INTERFACE: A common boundary between two pieces of hardware or between two systems (64:767).

INVENTORY MANAGEMENT: A term applied to the daily and periodic bookkeeping commonly associated with inventory control and forecasting the future needs of items or groups of items (64:767).

K: When referring to storage capacity, 1,024 bits (64:768).

KEY: One or more characters within a data record used to identify the record or to control its use (64:768).

MEMORY: A term often used to refer to a computer's storage facility (64:770).

MICROCOMPUTER: A very small computer; often a computer on a single chip (64:771).

MICROPROCESSOR: The central processing unit of a microcomputer which is implemented in a single integrated circuit that performs all data manipulation, programs, and decision-making logic and arithmetic/logic functions (64:771).

MILLISECOND: One thousandth of a second (64:771).

MINICOMPUTER: A small computer that operates on discrete data by performing arithmetic and logic processes on these data (64:771).

NETWORK: The interconnection of a number of points by data communications facilities (64:772).

OPERATING SYSTEM: Software that controls the execution of computer programs and that may provide scheduling, input/output control, compilation, data management, debugging, storage assignment, accounting, and other similar functions (64:773).

PERSONAL COMPUTER: A microcomputer used in the home or office to perform a wide variety of tasks, including game playing, control functions, educational uses, and business calculations (64:774).

PREVENTATIVE MAINTENANCE: The process in a computer system that attempts to keep equipment in continuous operating condition by detecting, isolating, and correcting failures before occurrence. It involves cleaning and adjusting the equipment as well as testing the equipment under both normal and marginal conditions (64:774).

RAM: Random Access Memory. A memory chip used with microcomputers and microprocessors. It is the main memory of a microcomputer. Information can be written into and read out of this memory and can be changed at any time by a new write operation (64:776).

ROM: Read Only Memory. Nonerasable, permanently programmed memory usually used to store monitors, input/output drivers, language interpreters, or special application programs (64:777).

SECOND-GENERATION COMPUTERS: A class of computers that utilized transistors in their electronic circuitry (64:778).

SOFTWARE: The computer programs, procedures, and documentation concerned with the operation of a computer system, for example, assemblers, compilers, operating systems, diagnostic routines, program loaders, manuals, library routines, and circuit diagrams. Software is the name given to the programs that cause a computer to carry out particular operations. Contrasted with hardware (64:778).

SUPERCOMPUTER: The largest, fastest, and most expensive computer available. Used by businesses and organizations that require extraordinary amounts of computing power (64:780).

THIRD-GENERATION COMPUTERS: A class of computers that utilized microminiaturized or integrated circuits (64:781).

USER FRIENDLY: Easy to operate with prompts stepping through the process (54:9).

VISUAL DISPLAY UNIT (VDU): A device that provides a visual display of data (64:783).

VOICE RECOGNITION: The ability to speak directly into the computer (64:783).

SELECTED BIBLIOGRAPHY

REFERENCES CITED

1. Adams, Frank J. "Micros Bolster Mainframes," Computer Decisions, January 1982, pp. 119-174.

2. Anderson, David R., Dennis J. Sweeney, and Thomas A. Williams. An Introduction to Management Science. 3d Ed. St Paul MI: West Publishing Company, 1982.

3. Andrews, William C. "A Personal Computer In Your Future?," Journal of Systems Management, April 1982, pp. 21-24.

4. Arnett, Thomas L. "Minicomputers: They're Becoming Larger, Stronger, Less Expensive," The Office, September 1980, pp. 124-131.

5. "As the Cost of Display Falls, So the Use Is Rising," Industrial Management & Data Systems, December 1980, pp. 40-48.

6. Babcock, David, and Fred Gruenberger. Computing With Minicomputers. Los Angeles CA: Melville Publishing Co., 1973.

7. Bayle, Elisabeth. "The Fortune 500 Microcomputers," Popular Computing, September 1982, pp. 62-64.

8. Brescia, Captain Robert, USA. "Micromangement At the Unit Level," Army Logistician, September-October 1982, pp. 22-23.

9. Breslin, Judson, and C. Bradley Tashenberg. Distributed Processing Systems. New York: Amacom, 1978.

10. Bride, Edward J., and E. Drake Lundell Jr. Computer Use, An Executives Guide. Boston: Allyn and Bacon, Inc., 1973.

11. Bridges, Ron. "Business Systems-2000 A.D.," Journal of Systems Management, February 1980, pp. 6-9.

12. Burnett, Major James D., USAF, and Captain Rodney L. Boatright, USAF. "The Use of Minicomputers In MAJCOM Logistics Management," Air Force Journal of Logistics, Spring 1980, pp. 6-8.

13. Carter, Lieutenant Colonel Bob, USAF, and First Lieutenant Mike Nunley, USAF. "The Micros Are Coming," TAC Attack, October 1981, pp. 4-6.

14. Carter, Lieutenant Colonel Harold W., USAF. Assistant Professor, Department of Electrical Engineering, AFIT/EN, Wright-Patterson AFB OH. Address to IEEE Symposium, Dayton Marriot Hotel, Dayton OH, 23 April 1983.

15. Cicio, Commander J.D., USN. "Office Automation-It's Here To Stay," The Navy Supply Corps Newsletter, February 1982, pp. 16-17.

16. Cooper, James Arlin. Microprocessor Background for Management Personnel. Englewood Cliffs NJ: Prentice-Hall, Inc, 1981.

17. Crawford, John. "Micro Computers In Corporate Applications," Information & Records Management, November 1982, pp. 20-40.

18. "DDP-New Markets Aimed At Specific Applications," Data Management, June 1982, pp. 44-46.

19. Doan, Michael. "A New-and Bigger-Computer Explosion," U.S. News & World Report, April 20, 1981, pp. 62-64.

20. Dologite, Dorothy G. "Small Business Computer Acquisition," Journal of Systems Management, March 1981, pp. 34-39.

21. Dzubow, Steven R., and Stephen McMenamin. "Information Systems In Social Services," Journal of Systems Management, April 1982, pp. 34-38.

22. "Drug Distributor Uses Micros," Computer Decisions, January 1982, pp. 122-123.

23. Editorial. "The Computer Question: Do We Have a National Federal ADP Emergency?," Government Executive, April 1981, pp.40-45.

24. Edwards, Chris. "Developing Microcomputer Based Business Systems," Journal of Systems Management, April 1983, pp. 36-38.

25. Emory, William C. Business Research Methods. Homewood IL: Richard D. Irwin, Inc., 1980.

26. Emrick, Ronald D. "Minicomputer Capacity Optimism," Datamation, December 1982, pp. 155-162.

27. Ferrarini, Elizabeth M. "Putting Personal Computers to Good Business Use," Administrative Management, April 1981, pp. 33-38.

28. Forester, Tom, ed. The Microelectronics Revolution. Cambridge MA: The MIT Press, 1981.

29. Friedrich, Otto. "The Computer Moves In," Time, January 3, 1983, pp. 14-24.

30. Gibson, Harry L., and Robert A. Rademacher. An Introduction to Computers and Information Systems. Cincinnati OH: South-West Publishing Company, 1983.

31. "Get Ready For Managerial Work-Stations," EDP Analyzer, December 1980, pp. 1-12.

32. Goebel, Captain L. A., USAF. Logistics Systems Behavioral Scientist, Air Force Logistics Management Center, Gunter AFS AL. Personal interview. 21 March 1983.

33. Grosswith, Marvin. "When The Boss Broke The Rules," Personal Computing, March 1983, pp. 67-223.

34. Hesprich, Steven F. "Corporate Brainchild-Microcomputers," Journal of Systems Management, August 1982, pp. 16-20.

35. Himrod, Bruce W. "Microcomputers for Small Business," The Journal of Accountancy, December 1979, pp.44-48.

36. Horton, James L., and David E. Scholl. "Is There A Microprocessor In Your Future?," Public Relations Journal, March 1982, pp. 34-36.

37. Hopper, Captain Grace N., USN. Director, Naval Data Automation Development Division. Address to AFIT students, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, 1980.

38. Husbands, Bernard. "Electronic Mail-Applications for Management," Journal of Systems Management, August 1982, pp. 6-8.

39. Jones, Christopher G. "Computer: Job Gobbler or Helpmate?," Journal of Systems Management, November 1981, pp. 26-29.

40. Kanter, Jerome. Management-Oriented Management Information Systems. 2d ed. Englewood Cliffs NJ: Prentice-Hall, Inc., 1977.

41. Kelly, Joseph F. Computerized Management Information Systems. New York:The MacMillan Company, 1970.

42. Kull, David, and Julia G. Brown. "The Multifunction Mini," Computer Decisions, August 1982, pp. 113-128.

43. Lasden, Martin. "Computer-Aided Decision-Making," Computer Decisions, November 1982, pp. 156-172.

44. Lay, Peter M., and George F. Ellis. "Graphics Design for Management," Journal of Systems Management, August 1982, pp. 37-42.

45. Levielle, Greg R. "Small Business Computers; the Need For Them is Increasing," The Office, July 1979, pp. 77-79.

46. Lombardi, Lieutenant Colonel Richard D. Chief, Small Computer Office, HQ Air Force, Pentagon, Washington DC. Telephone interview. 17 January 1983.

47. Lewis, R., and D. Tagg, eds. Computers in Education. New York: North Holland Publishing Company, 1981.

48. Mahmood, Mo A. "Choosing Computer Services for Small Businesses," Journal of Systems Management, July 1982, pp. 22-24.

49. McRae, Colonel Milton W. Director of Supply, HQ SAC/LGS. Letter, subject: Use of Mini-computers in Supply, to HQ USAF/LEYS, 9 July 1981.

50. Meserve, Lieutenant Colonel Phillip A., USAF. "Is There A Minicomputer In Your Future?," The Air Force Comptroller, July 1982, pp. 36-39.

51. Murlijacic, Tony. "Computer Graphics: A 20-Year Forecast," Journal of Systems Management, November 1981, pp. 17-21.

52. Nichols, Senior Master Sergeant Walter A. Supply Management Analyst, Air Force Logistics Management Center, Gunter AFS AL. Personal interview. 21 March 1983.

53. Orlansky, Jesse, and Joseph String. "Computer-Based Instruction For Military Training," Defense Management Journal, Second Quarter 1981, pp. 46-54.

54. Popple, Joseph P. Deputy Comptroller of the Air Force, HQ USAF/AC. Letter, subject: Small Computer Acquisition and Management in Base Level Comptroller Functions, to All MAJCOM/SOA Comptrollers, 26 October 1982.

55. "Programming by End Users," EDP Analyzer, May 1981, pp.1-15.

56. Sachs, Randi T. "Office Use of Personal Computers," Administrative Management, August 1982, pp. 39-45.

57. Schatz, Willie. "New Conquests for the Computer," Nation's Business, June 1982, pp. 67-76.

58. Schwartz, Donald A. "Microcomputers Take Aim On Small Business Clients," The Journal of Accountancy, December 1979, pp. 57-59.

59. Seibert, Graham H. "Division Level Data Entry Device," Army Logistician, May-June 1982, pp. 17-19.

60. Shapiro, Mark. "Minicomputers in City Government," Journal of Systems Management, July 1980, pp. 12-14.

61. Slater, Leland W. "LEMS, Low-cost Expandable Minicomputer System," Access, Vol 3, No 4, 1981, pp. 8-14.

62. "Small Computer for a Big Business," Office, October 1978, p. 128.

63. Smith, E. Ray. "Small Computers In the Base Comptroller," The Air Force Comptroller, July 1982, pp. 38-39.

64. Spencer, Donald D. Introduction to Information Processing. Columbus OH: Charles E. Merrill Publishing, 1981.

65. "The Coming Impact of New Technologies," EDP Analyzer, January 1981, pp. 1-14.

66. Thierauf, Robert J. Systems Analysis and Design of Real-Time Management Information Systems. Englewood Cliffs NJ: Prentice-Hall, Inc., 1975.

67. "Users Polish Skills On Apples," Computer Decisions, January 1982, pp. 173.

68. Vinzant, H. P. Chief, Supply Systems Plans and Development Section, Air Force Data Systems Design Center, Gunter AFS AL. Personal interview. 22 March 1983.

69. Veit, Stanley S. "How a Computer Can Help Your Business," Nation's Business, June 1982, pp. 78-80.

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